



How Data Modeling Fits Into an Overall Enterprise Architecture

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Global Data Strategy Ltd.

DAMA Phoenix

Sept 19th , 2017



Agenda 8:30am – 12pm

What we'll cover today

- Data driving business transformation – the importance of data architecture
- How data modeling fits within a larger enterprise architecture
- The importance of business-centric data models
- Key architectural tools & components
- Sprinkled throughout
 - Case studies
 - Workshops
 - Surveys & industry stats
 - Bad jokes
- Summary & questions

Who Am I?

Donna Burbank is a recognised industry expert in information management with over 20 years of experience in data strategy, information management, data modeling, metadata management, and enterprise architecture. Her background is multi-faceted across consulting, product development, product management, brand strategy, marketing, and business leadership.

She is currently the Managing Director at Global Data Strategy, Ltd., an international information management consulting company that specializes in the alignment of business drivers with data-centric technology. In past roles, she has served in key brand strategy and product management roles at CA Technologies and Embarcadero

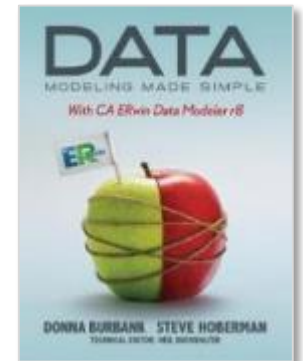
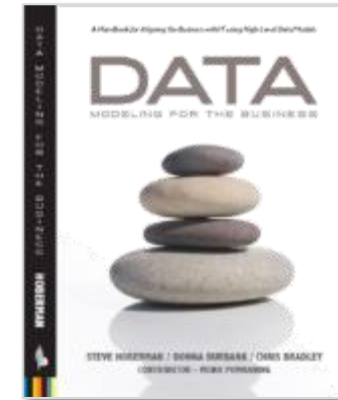
Technologies for several of the leading data management products in the market.

As an active contributor to the data management community, she is a long time DAMA International member, Past President and Advisor to the DAMA Rocky Mountain chapter, and was recently awarded the Excellence in Data Management Award from DAMA International in 2016.

She was on the review committee for the Object Management Group's (OMG) Information Management Metamodel (IMM) and the Business Process Modeling Notation (BPMN). Donna is also an analyst at the Boulder BI Train Trust (BBBT) where she provides advices and gains insight on the latest BI and Analytics software in the market.

Follow on Twitter @donnaburbank

She has worked with dozens of Fortune 500 companies worldwide in the Americas, Europe, Asia, and Africa and speaks regularly at industry conferences. She has co-authored two books: *Data Modeling for the Business* and *Data Modeling Made Simple with ERwin Data Modeler* and is a regular contributor to industry publications. She can be reached at donna.burbank@globaldatastrategy.com. Donna is based in Boulder, Colorado.



About Global Data Strategy, Ltd

Data-Driven Business Transformation

- Global Data Strategy is an international information management consulting company that specializes in the alignment of business drivers with data-centric technology.
- Our passion is data, and helping organizations enrich their business opportunities through data and information.
- Our core values center around providing solutions that are:
 - **Business-Driven:** We put the needs of your business first, before we look at any technology solution.
 - **Clear & Relevant:** We provide clear explanations using real-world examples.
 - **Customized & Right-Sized:** Our implementations are based on the unique needs of your organization's size, corporate culture, and geography.
 - **High Quality & Technically Precise:** We pride ourselves in excellence of execution, with years of technical expertise in the industry.

Business Strategy



Aligned With



Data Strategy



Visit www.globaldatastrategy.com for more information



DATAVERSITY Lessons in Data Modeling Series

This Year's Line Up

- **January** - *on demand* How Data Modeling Fits Into an Overall Enterprise Architecture
- **February** - *on demand* Data Modeling and Business Intelligence
- **March** - *on demand* Conceptual Data Modeling – How to Get the Attention of Business Users
- **April** - *on demand* The Evolving Role of the Data Architect – What does it mean for your Career?
- **May** - *on demand* Data Modeling & Metadata Management
- **June** - *on demand* Self-Service Data Analysis, Data Wrangling, Data Munging, and Data Modeling
- **July** - *on demand* Data Modeling & Metadata for Graph Databases
- **August** - *on demand* Data Modeling & Data Integration
- **September 28** Data Modeling & Master Data Management (MDM)
- **October 26** Agile & Data Modeling – How Can They Work Together?
- **December 5** Data Modeling, Data Quality & Data Governance



Who Are You? Survey

How Would You Describe Your Role?



Businessperson or Business Analyst



Data Architect, Data Modeler, or Data Analyst



Enterprise Architect



Business Intelligence Analyst or Developer



DBA, Programmer, or Technical IT



Data Scientist



A combination of the above



Other





Data Driving Business Transformation

The Importance of Architecture

Digital Transformation is Driven by Data

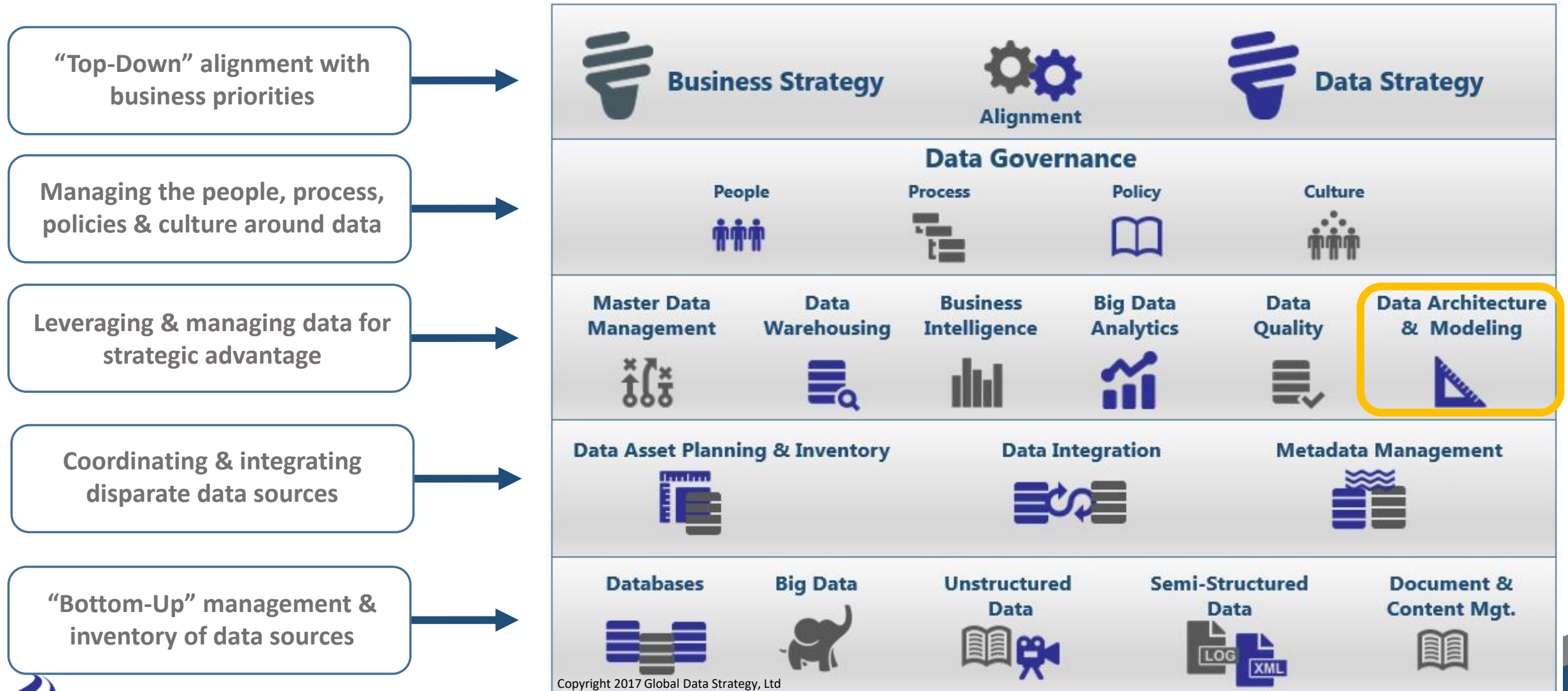
Driving new business models

Today's Digital Transformation is largely driven by the availability, volume, and interconnectedness of **data**.

It is transforming the very way organizations do business.

Data Architecture is part of a Wider Data Strategy

A Successful Data Strategy links Business Goals with Technology Solutions



How can we Transform our Business through Data?

Business Optimization Becoming a *Data-Driven Company*

- Making the Business More Efficient
 - Better Marketing Campaigns
 - Higher quality customer data, 360 view of customer, competitive info, etc.
 - Better Products
 - Data-Driven product development, Customer usage monitoring, etc.
 - Better Customer Support
 - Linking customer data with support logs, network outages, etc.
- Lower Costs
 - More efficient supply chain
 - Reduced redundancies & manual effort

How do we do
what we do
better?

Business Transformation Becoming a *Data Company*

- Changing the Business Model via Data – data becomes the product
 - Monetization of Information: examples across multiple industries including:
 - *Telecom*: location information, usage & search data, etc.
 - *Retail*: Click-stream data, purchasing patterns
 - *Social Media*: social & family connections, purchasing trends & recommendations, etc.
 - *Energy*: Sensor data, consumer usage patterns, smart metering, etc.

How do we do
something
different?



Consumer Energy Company

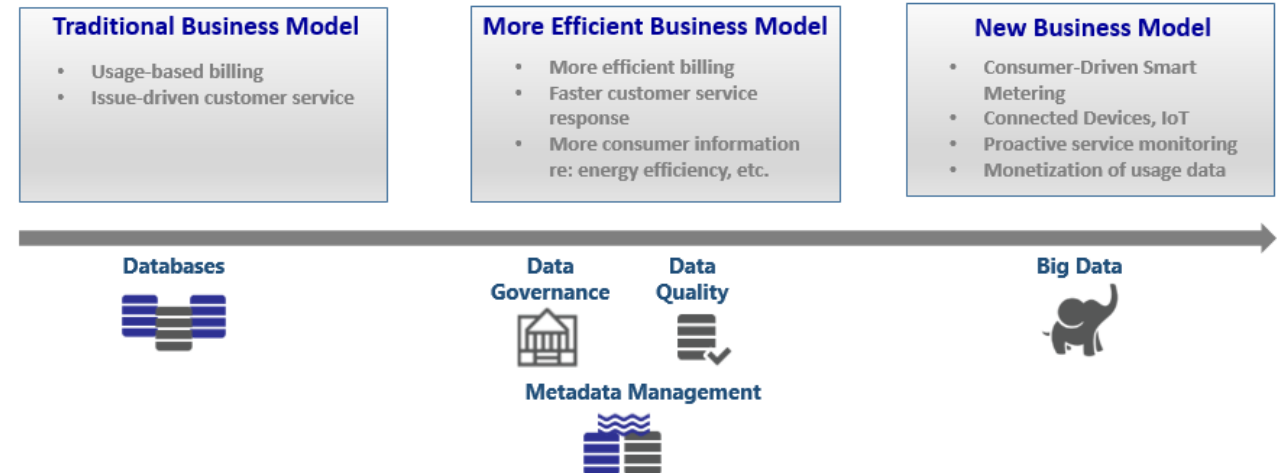
Business Transformation through Data

Objectives

- For the consumer energy sector **Big Data and Smart Meters are transforming the ways of doing business** and interacting with customers.
 - Moving away from traditional data use cases of metering & billing.
 - Smart meters allow customers to be in control of their energy usage.
 - Control over energy usage with connected systems
 - Custom Energy Reports & Usage
 - Smart Billing based on usage times
- As energy usage declines, **data is becoming the true business asset** for this energy company.
 - Monetization of non-personal data is a future consideration.
- While the Big Data Opportunity is crucial, equally important are the traditional data sources
 - Data Quality critical for operational and DW data
 - Data Governance critical for analyzing data in relation to business processes & roles
 - With high volumes of data, critical data elements needed to be prioritized

Result

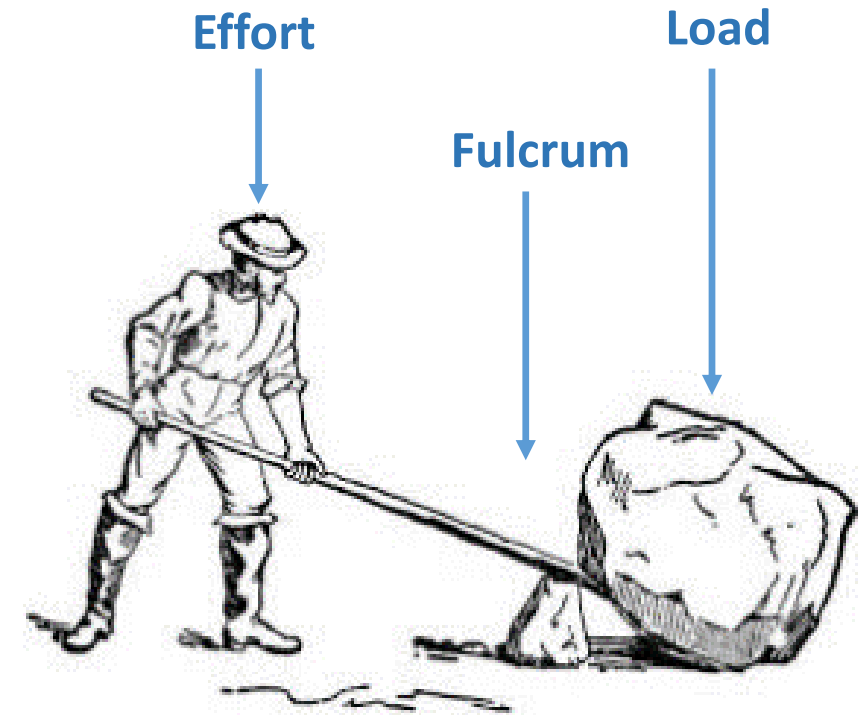
- Data Definition & Governance in Place for Critical Data
 - Business-critical data elements identified
 - Data Definitions created
 - Data Governance Program analyzing data in relation to business processes & roles



Look for Business Value “Levers”

Identify “Quick Wins”

- Identify areas that will derive the highest business value by addressing.
 - Is this supporting the new marketing campaign for a high visibility product launch?
 - Or are you “re-arranging the deck chairs on the Titanic” – i.e. focusing valuable time and effort on low-value activities
- As with any areas of the business that have value, it is helpful to build a model or architectural design around the key areas of business value.

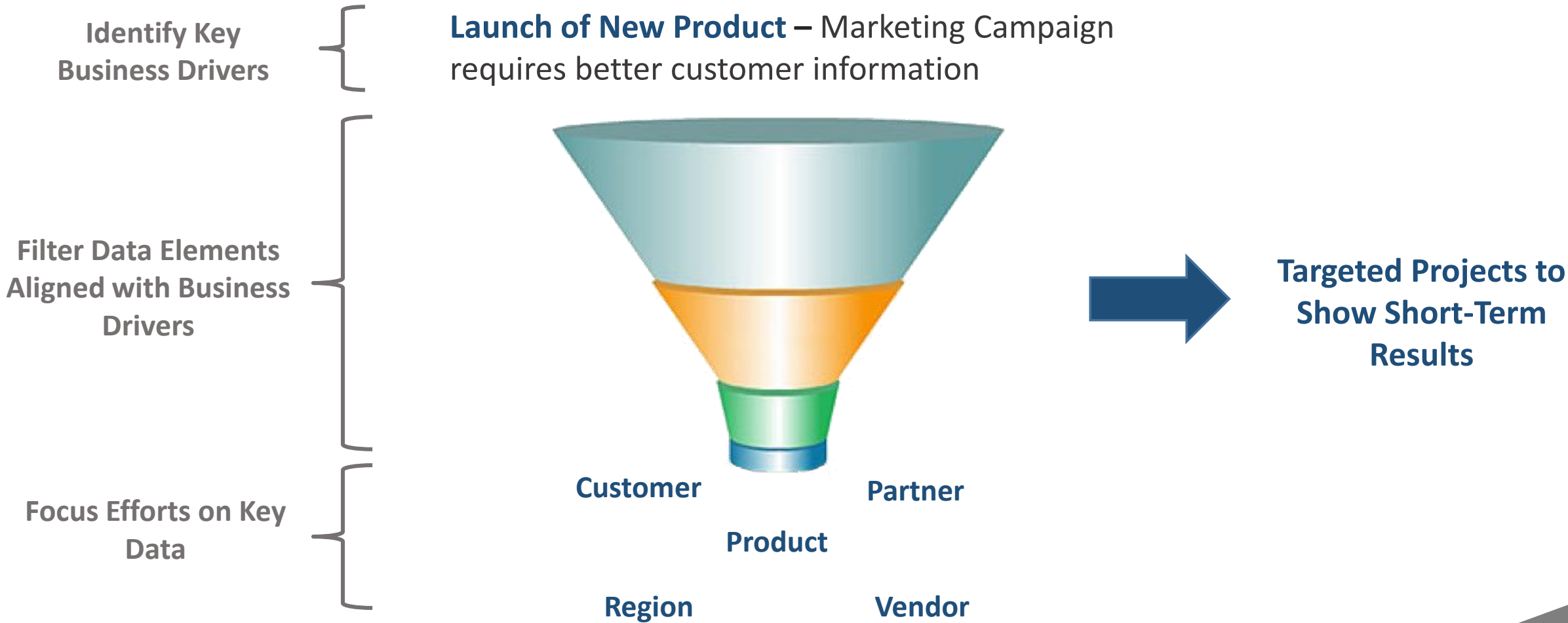


Identify areas where data can be the fulcrum.



Identify High-Priority Data Elements

Align with Business Drivers





How Data Fits Within a Larger Enterprise Architecture

Enterprise Architecture - Definition

Supporting Business Innovation with a Strong Architectural Foundation

- Enterprise architecture (EA) is a discipline for proactively and holistically leading enterprise ***responses to disruptive forces by identifying and analyzing the execution of change toward desired business vision and outcomes.***
- ...by presenting business and IT leaders with signature-ready recommendations for adjusting policies and projects to achieve target business outcomes that capitalize on relevant business disruptions.
- EA is used to steer decision making toward the ***evolution of the future state architecture.***¹

Innovation



Foundation



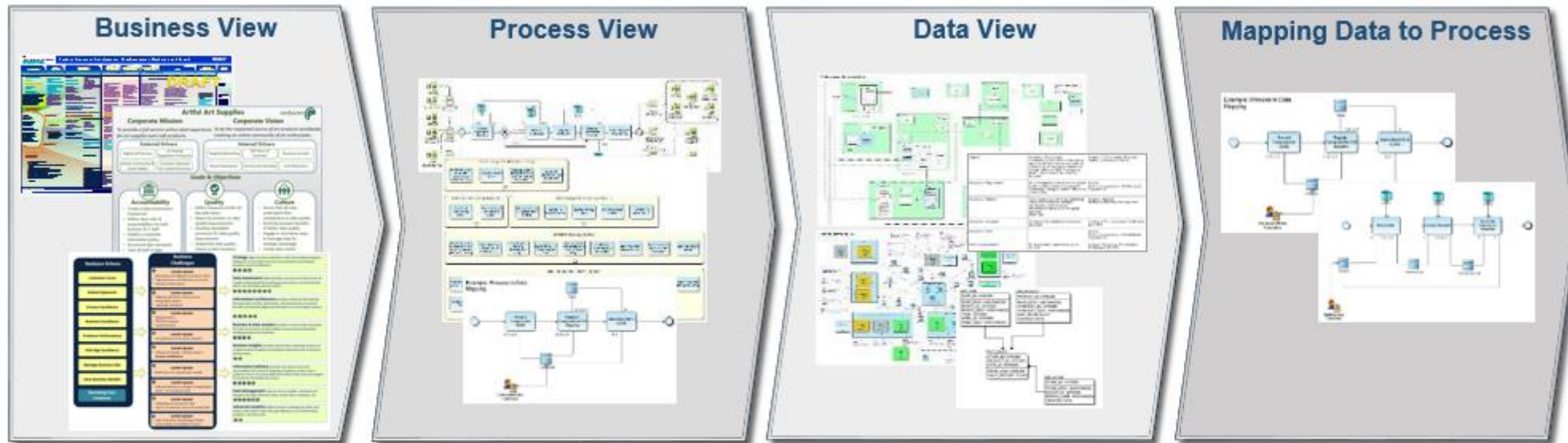
Enterprise Architecture – Definition for Data Architects

Modeling is important on many levels

- Just as you need to model the data in an organization, you need to model the organization itself:
 - Motivations & Goals
 - Business Capabilities
 - Business Processes
- As well as the related technologies that support the organization
 - Applications
 - Data
 - Networks
 - Etc.

Data Modeling for Enterprise Architecture

- Enterprise Architecture provides a high-level view of the people, processes, applications, and data of an organization
- Putting data in business context
 - How does data link to the rest of my organization?
 - If I change data, what business processes are affected?



- Motivation Model
- Business & Data Capability
- Mapping Business Drivers to Data Mgt Capabilities

- High-Level Process Models
- Detailed Process Models

- Conceptual Data Models
- Business Glossary
- Logical Data Models
- Physical Data Models

- Process to Data Mapping
- Where Used / CRUD Analysis



International Pharmaceutical Company

Business Alignment through Data-Driven Enterprise Architecture



Objectives

- An international Pharmaceutical company was looking to make better use of its data to streamline its Clinical Development, Commercial Processes, and R&D.
- Business alignment was a key first step
 - Created “blueprints” of how the business runs—then how data maps to that
 - Data models, process models, & mappings
- Streamlining IT Services was a core parallel activity
 - Best Practices & Enterprise Architecture
 - New best practices around architecture, data modeling, etc.
 - Data Governance
 - Models, metadata, & architecture defined
 - Solution Planning & Definition
 - Defining “who we are & what we do” , aka “Marketing”

Result

- Data-driven Efficiencies and Process Improvement were discovered in the R&D process.
- Business stakeholders were convinced of the value of data management & governance
- Greater understanding how data was used by and critical to key business activities
- Data Governance was initiated into each new project, with data models, metadata & architecture being key stage gates for approval



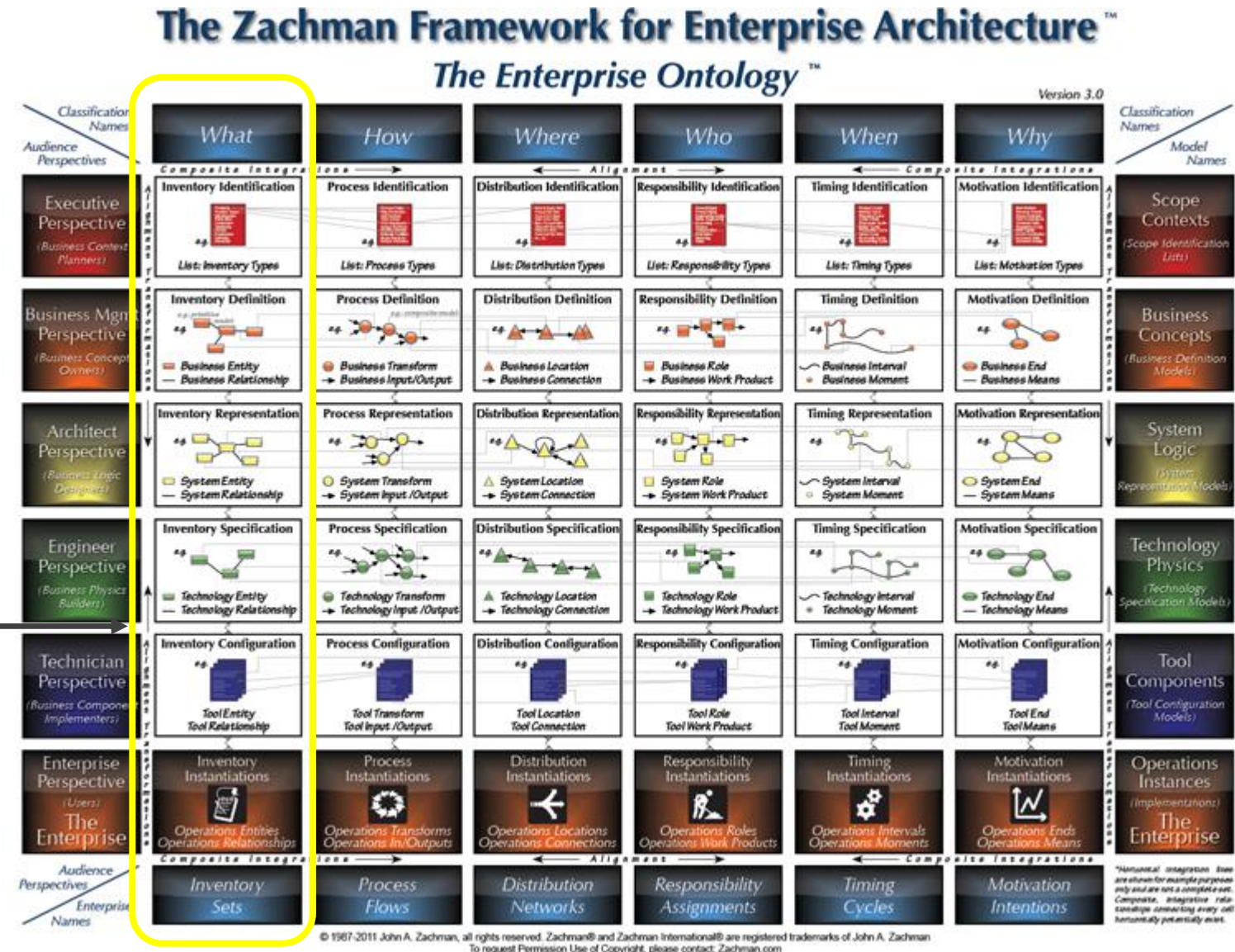
Frameworks for Enterprise Architecture

Zachman Framework

- The Zachman Framework organizes data into the simple categories of:

- What
- How
- Where
- Who
- When
- Why?

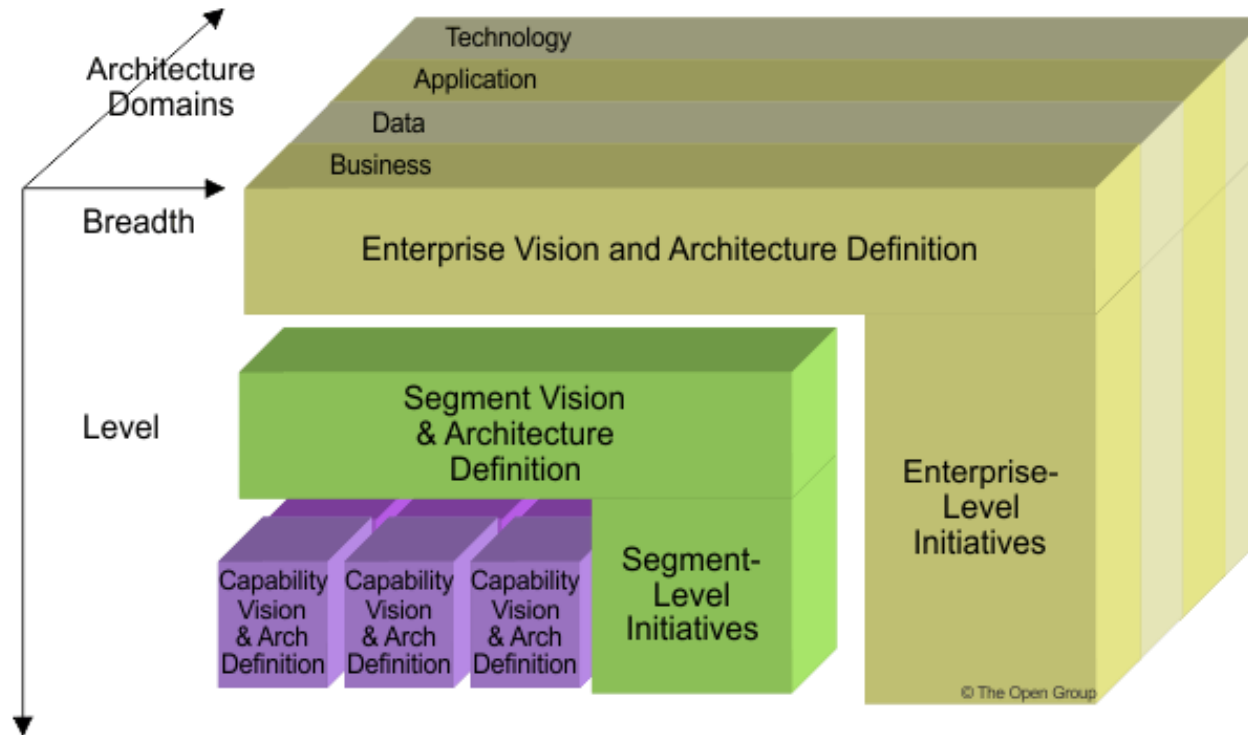
- Data fits nicely within the “What” column.



Frameworks for Enterprise Architecture

TOGAF EA Framework

- The TOGAF Architecture Development Method (ADM) developed by the OpenGroup is a step-by-step approach to developing an enterprise architecture.
- It provides a detailed framework for building an architecture around Business, Data, Application & Technology.



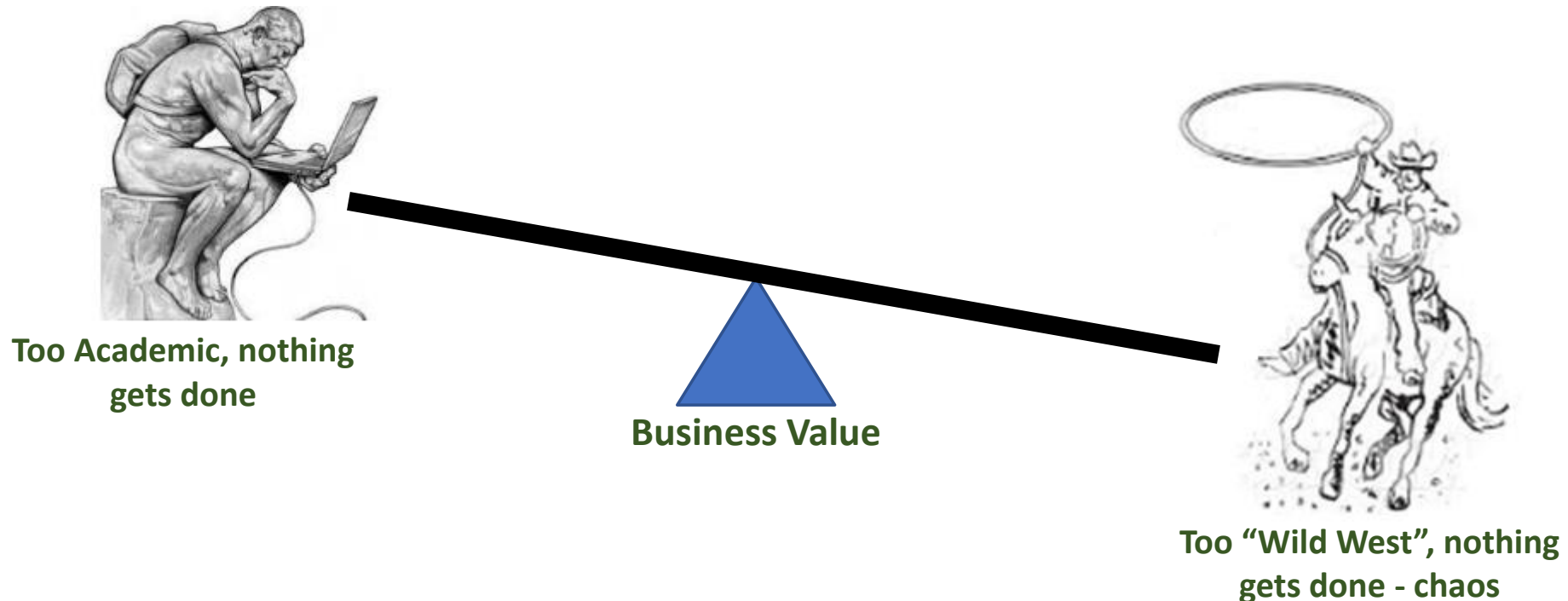
www.opengroup.org

Find a Balance in Implementing Enterprise Architecture

Focus on Business Value

- Find the Right Balance

- Enterprise Architecture projects can have the reputation for being overly “academic”, long, expensive, etc.
- No architecture at all can cause chaos.
- When done correctly, Enterprise Architecture helps improve efficiency and better align with business priorities





Gaining Business Buy-In

A Seat at the Table

The Role of the Data Professional in the Data-Driven Business

- In the current environment of data-driven business, Data Professionals have an opportunity to have a “seat at the table”
 - Finding new opportunities to leverage data for business benefit
 - Creating efficiencies & business process optimization
 - Integrating data from disparate sources for new business insights
 - Supporting organizational change



Be More “Data Advisor” and Less “Data Architect”

Data Architect

- Focused on architecture, data, technology
- Often seen as finding problems, not solutions
- “Let me tell you about my data model!”

The world is going to end if your model is not in 3rd normal form!!



Business Executive

- Results-Oriented
- Optimistic – Identifies opportunities
- “I’m busy.”
- “What’s the business opportunity?”

What’s in it for me?



Data Advisor

- Focused on solutions, business, information
- Highlights issues & opportunities around data
- “Less me show you how data can help your business!”

If you link your Customer data with your Product usage stats, we can increase sales.



We Do It, Too – We Care about Results, not Details!

Do we really care about the details of other people's jobs?

We recently switched to accrual-based accounting from cash-based accounting to optimize...



Accountant

I just want my paycheck.

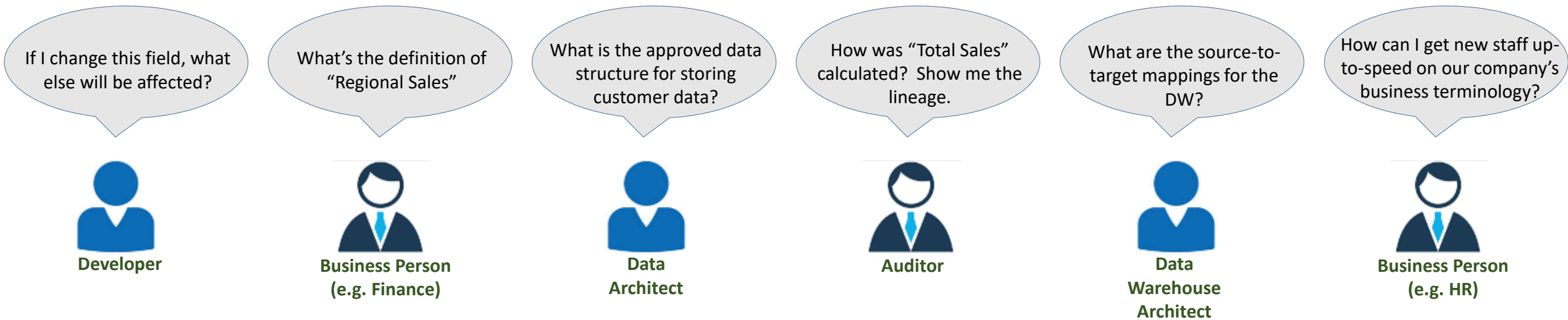


Data Architect



Who Uses Data Models & Metadata?

- Metadata is used and created by a wide range of roles across the organization.
- Business users are key users.



Metadata is Needed by Business Stakeholders

Making business decisions on accurate and well-understood data

80% of users of metadata are from the business, according to the recent DATAVERSITY survey.

“Metadata helps both IT and business users understand the data they are working with. Without Metadata, the organization is at risk for making decisions based on the wrong data.”



Technical & Business Metadata

- **Technical Metadata** describes the structure, format, and rules for storing data
- **Business Metadata** describes the business definitions, rules, and context for data.
- **Data** represents actual instances (e.g. John Smith)

Technical Metadata

```
CREATE TABLE EMPLOYEE (  
  employee_id    INTEGER NOT NULL,  
  department_id  INTEGER NOT NULL,  
  employee_fname VARCHAR(50) NULL,  
  employee_lname VARCHAR(50) NULL,  
  employee_ssn   CHAR(9) NULL);
```

```
CREATE TABLE CUSTOMER (  
  customer_id    INTEGER NOT NULL,  
  customer_name  VARCHAR(50) NULL,  
  customer_address VARCHAR(150) NULL,  
  customer_city  VARCHAR(50) NULL,  
  customer_state CHAR(2) NULL,  
  customer_zip   CHAR(9) NULL);
```

Business Metadata

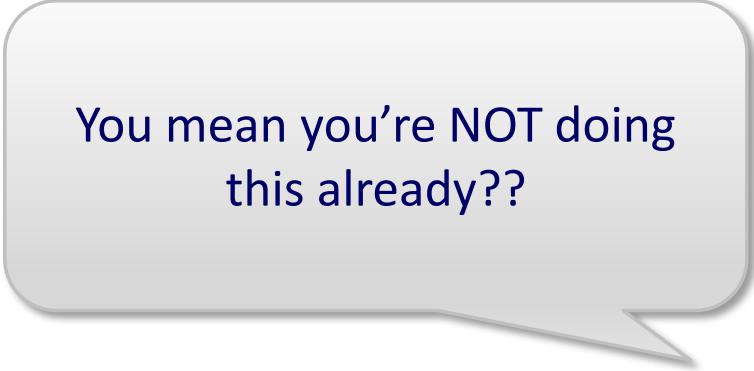
Term	Definition
Employee	An employee is an individual who currently works for the organization or who has been recently employed within the past 6 months.
Customer	A customer is a person or organization who has purchased from the organization within the past 2 years and has an active loyalty card or maintenance contract.

Data



John Smith

My Favorite Quote from a Business Stakeholder



You mean you're NOT doing
this already??

Often the biggest challengers to data modeling & metadata come from IT, not the business.

Stakeholder Analysis

- Stakeholders are key to the success or failure of your data program. Like data assets, they should be analyzed and managed.
- A number of tools and techniques exist to help manage stakeholders.
 - **Stakeholder Map:** Listing of key stakeholders with their roles, contact information, location, etc.
 - **Interest/Influence matrix:** Rank stakeholders by level of interest vs. amount of influence they hold.
 - **Interest matrix:** Identify key interest areas and map their importance to each stakeholders or stakeholder group.
 - **Interview Schedule & Key Questions:** Plan the interview schedule to respect stakeholders' time. Identify key questions ahead of the meeting.
 - **Preferred Communication Styles:** Identify the Styles of communication preferred by stakeholders & their communication styles (email, face to face meeting, coffee, introvert/extrovert, etc.)
 - **Communication Plan:** Develop a phased communication plan including feedback, reporting, metrics, etc.



Stakeholder Matrix

- Keeping track of “who’s who”: Create a simple stakeholder matrix outlining the key stakeholders, their roles, involvement, influence, impact, etc.
- Create a simple stakeholder matrix outlining the key stakeholders, their roles, involvement, influence, impact, etc.

Stakeholder Matrix												
Stakeholder Name / Group	Job Title/Role	Location	Involvement				Project	Influence	Impacted	Phone	Email	
			R	A	C	I		H / M / L	H / M / L			
EXECUTIVE REVIEW												
Mary Smith	CIO	Plano, TX	X			X	R: Responsible A: Accountable C: Consulted I: Informed					
Robert Quantiles	CFO	New York, NY			X	X		Finance data	H	H	+1 (214) 555-1212	mary.smith@thisco.com
STEERING GROUP												
Stuart Ling	Director of Enterprise Architecture	San Francisco, CA	X	X			Core working group	H	H	+1 (415) 555-1212	stuart.ling@thisco.com	
Ian Wordingham	Director of Data Strategy	London, UK	X	X			Core working group	H	H	+44 (020) 1234 1234	ian.wordingham@thisco.com	
Melissa Smith	Strategic Consultant	Edinburgh, UK			X		Core working group	H	L	+44 131 123 1234	melissa.smith@thisco.com	
DATA ARCHITECTURE												
Eric Wong	Data Architect	Plano, TX			X	X	Recommendations & input on data architecture	M	H	+1 (214) 555-1212	eric.wong@thisco.com	
Wendy Collington	Data Architect	San Francisco, CA			X	X	Recommendations & input on data architecture	M	H	+1 (415) 555-1212	wendy.collington@thisco.com	
Myles Stuart	DBA	Plano, TX				X	Historical input on legacy systems	L	M	+1 (214) 555-1212	myles.stuart@thisco.com	
ETC - Other IT Groups listed												
FINANCE												
Lisa Winston	Director of Finance	New York, NY			X	X	Input into US finance needs for data	H	H	+1 (214) 555-1212	lisa.winston@thisco.com	
Timothy Preston	EMEA Finance Lead	London, UK			X	X	Input into EMEA finance needs for data	H	H	+44 (020) 1234 1234	timothy.preston@thisco.com	
Juan Morales	Latin America Finance Lead	Santiago, CL			X	X	Input into LATAM finance needs for data	H	H	+56 2 12345678	juan.morales@thisco.com	
ETC - Other Business Groups listed												

RACI *:

R: Responsible

A: Accountable

C: Consulted

I: Informed



Speak with a Wide Variety of Stakeholders

- It's important to speak with a wide range of roles across the organization.
 - Business & IT
 - Cross-functional teams (Marketing, Finance, Analytics, etc, etc.)
- Understand key opportunities & challenges.
- Recruit allies & volunteers (and identify those you still need to convince. 😊)



Stakeholder Feedback

- Determine key business issues & drivers through direct feedback.

There is limited ownership or enforcement of common practices and standards across the projects

We have 15 customer databases – with many duplications.

\$12m has been spent on projects to clean up the data over the past 2-3 years

Where do I go to get the definition of “default banking standard”?

I didn’t know we had any documented data standards

I just joined the company and don’t understand all of the acronyms!

There was an error in reporting products by customer & region that was noticed by upper management.

Key subject matter experts are relied upon to review detailed data from various systems to ensure accuracy

I need a central, accurate view of all my customers worldwide.

I hear that our competitors are using the Semantic Web. Should we?



Issue Matrix

- An Issue Matrix lists:
 - Key Themes & Issues around metadata
 - Which teams are interested in each issue / theme
- Creates a “heat map” of priorities

Key Issues & Themes	Leadership	Sales	Finance	Marketing	Support	R&D	HR	Legal	Compliance
Improved Customer Information	X	X	X	X	X	X	X	X	X
No Cross-Domain Integration view (Sales, Marketing, Support, etc.)	X	X	X	X	X	X	X	X	X
Inconsistent Definitions of Key Business Terms	X	X	X	X	X			X	X
Inconsistent Summarization/Timing (e.g. Monthly view)	X	X	X						
External data integration needed				X	X				
Faster Time-to-Market for New Applications	X	X		X		X			
Lack of standards creating quality issues & rework					X	X			
Siloes of information slow development across teams	X	X		X	X	X	X		
Increase Efficiency & Reduce Costs									
System Redundancy	X	X	X	X	X	X			
Staff spend extra hours looking for information	X	X	X	X	X	X	X	X	X
Rework needed due to incorrect definitions			X		X	X			
Etc.									

Building the Business Case

Making the Case for Change

- Make the Right Business Case to the Right Audience
 - Know your audience – do they want a spreadsheet, quick PowerPoint, 100 page document, water cooler conversation?
 - Understand what detail is needed, i.e. don't "overkill" – sometimes simple is better
 - Focus on high-priority business needs
 - Define key business metrics for success aligned with data mgt deliverables
- Plan to start small, with a plan to build to a longer-term goal
- Lay out the current status quo including
 - Successes to date
 - Challenges with current structures & processes
 - Include a 'no action' option and the implications of letting the status quo continue
- Include Metrics & Anecdotes where possible
 - Cost savings or revenue gains
 - Data quality improvements
 - Compliance & regulatory issues
 - Any real-world anecdotes that can be shared (e.g. We underreported sales last year due to data quality issues.)



VS



The “Elevator Pitch”

How Would you Describe Your Project to the CEO in 2 minutes?



VS.



Exercise: 10 mins

Now You Try It!

- Write a 2 minute “elevator pitch” for your current project.
- We’ll take volunteers to present to the class.





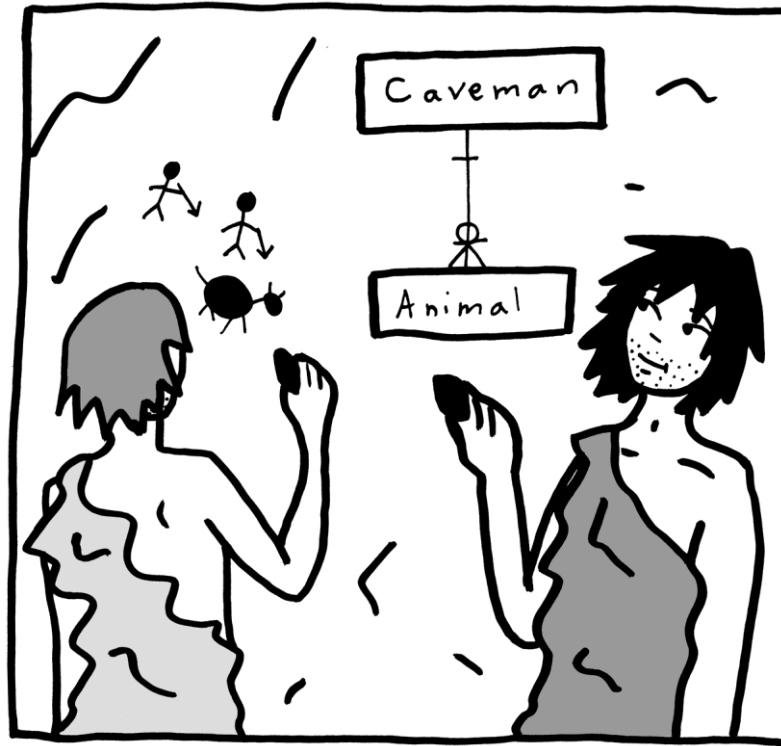
Business-Centric Data Modeling

Telling the Story

A Data Model Is a Visual Representation of Core Concepts

A data model is a graphical view of the core concepts important to the organization.

Humans tend to think in Pictures.



Levels of Data Models

Audience

Business Stakeholders
Data Architects

Business Stakeholders
Data Architects

Data Architects
Business Analysts

DBAs
Developers

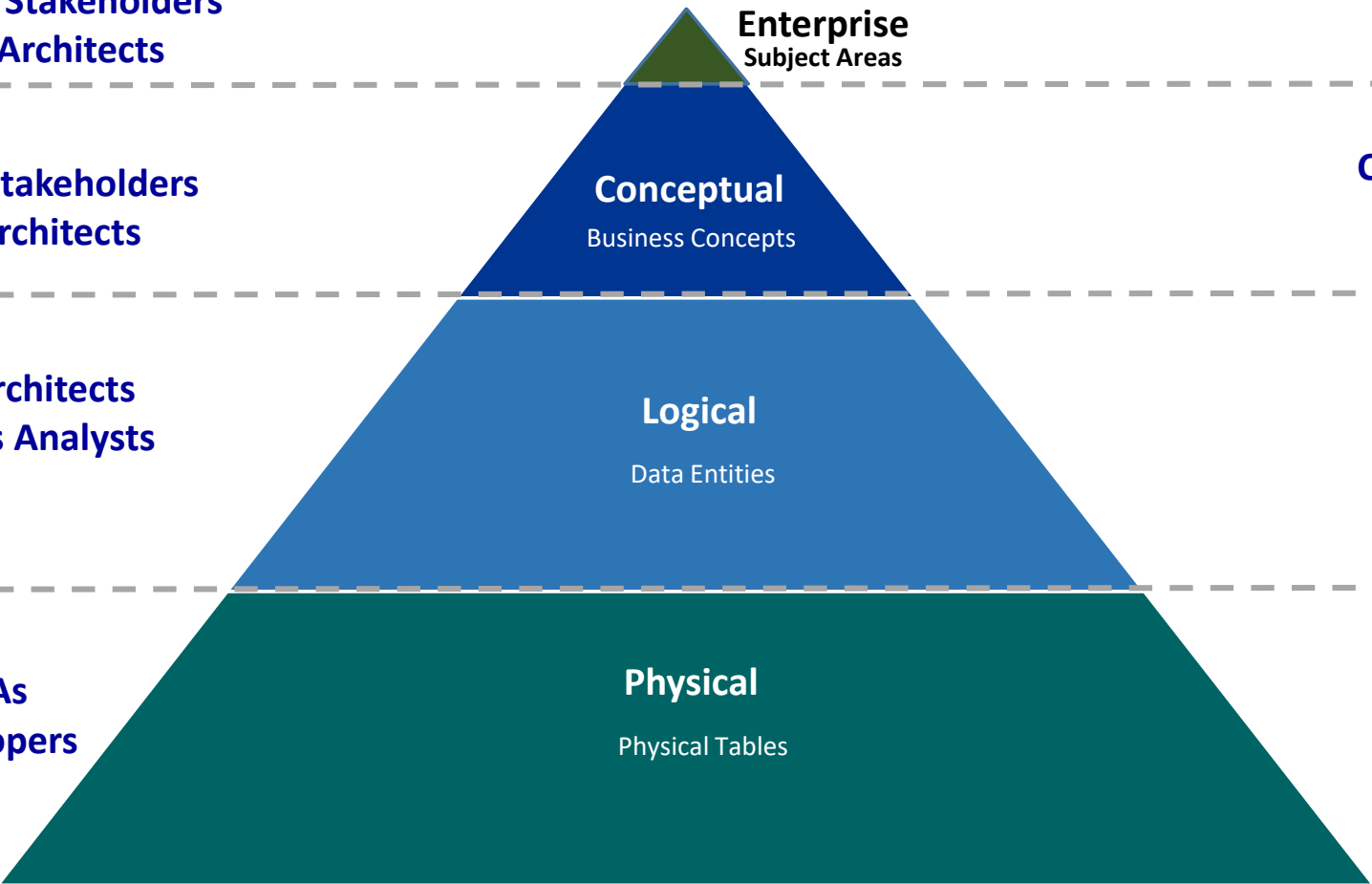
Purpose

Organization & Scoping of main
business domain areas

Communication & Definition of
Business Concepts & Rules

Clarification & Detail
of Business Rules &
Data Structures

Technical
Implementation on
a Physical Database



Survey

DAMA Phoenix

Who is currently using a
data model in their
organization?



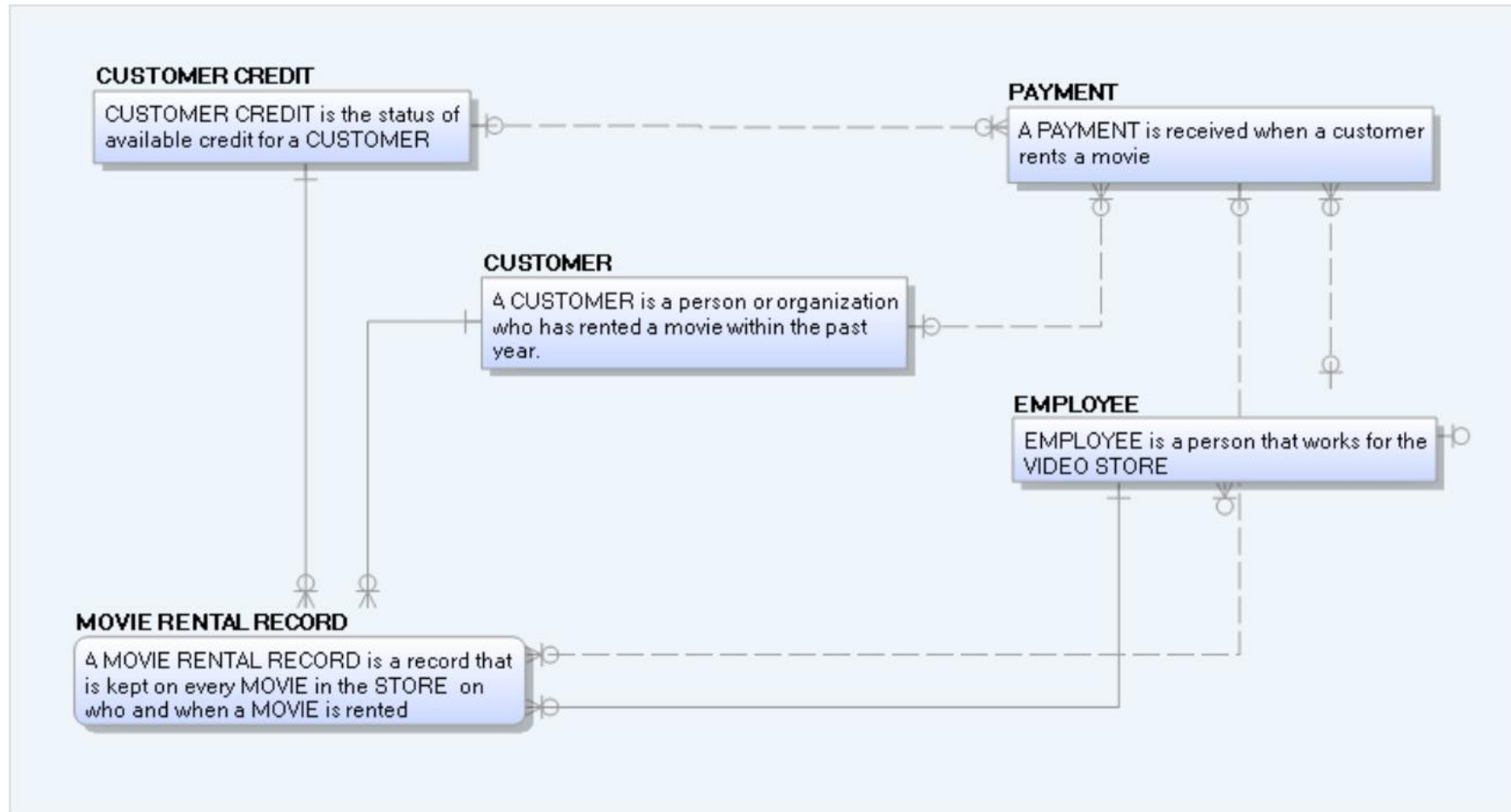
Industry Survey Results*

Over 96% of DATAVERSITY
respondents are using a data
model*.



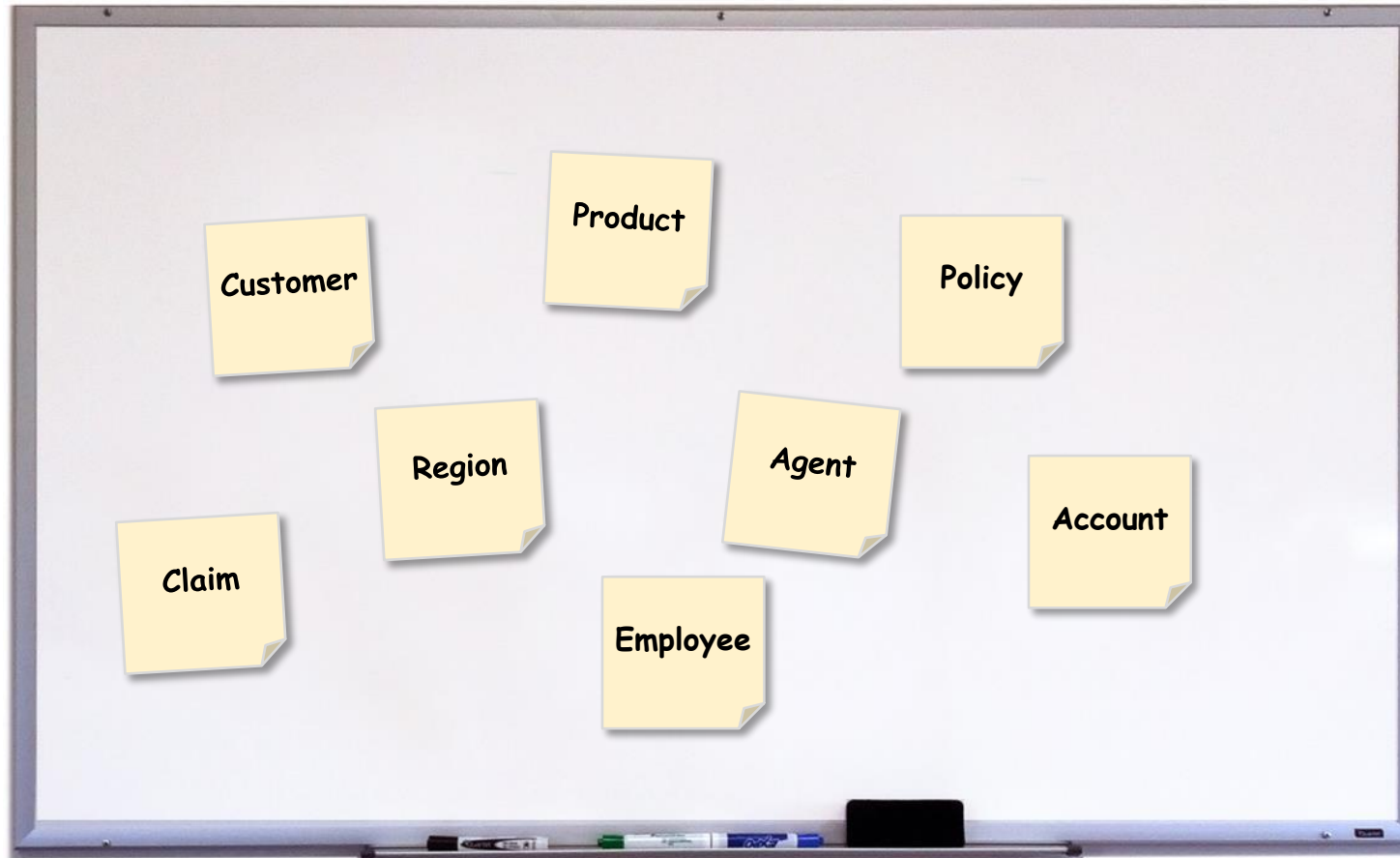
Conceptual Data Model

- Communication & definition of core data concepts & their definitions



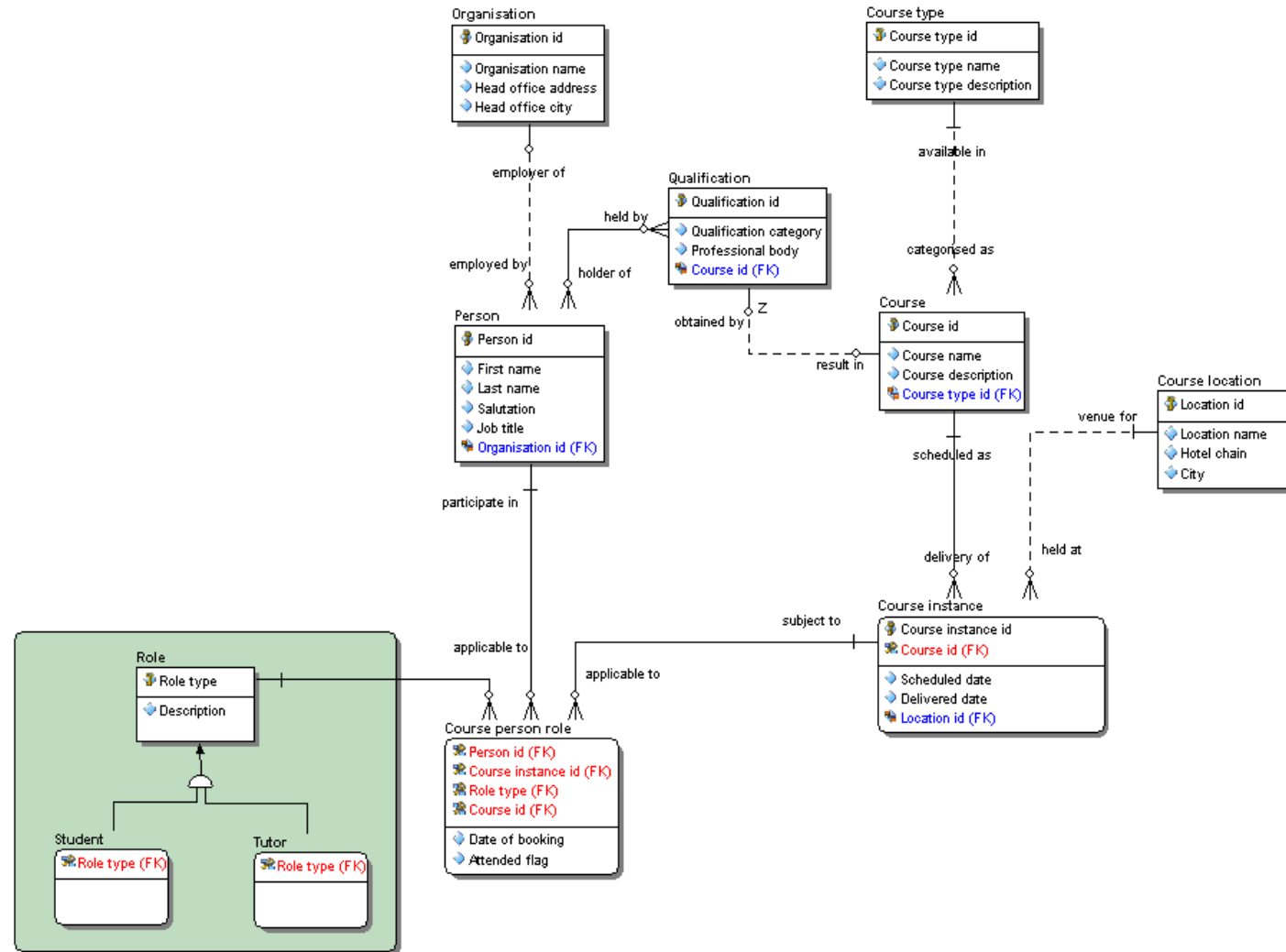
The Value of Whiteboarding

It's often helpful to “whiteboard” data models with sticky notes



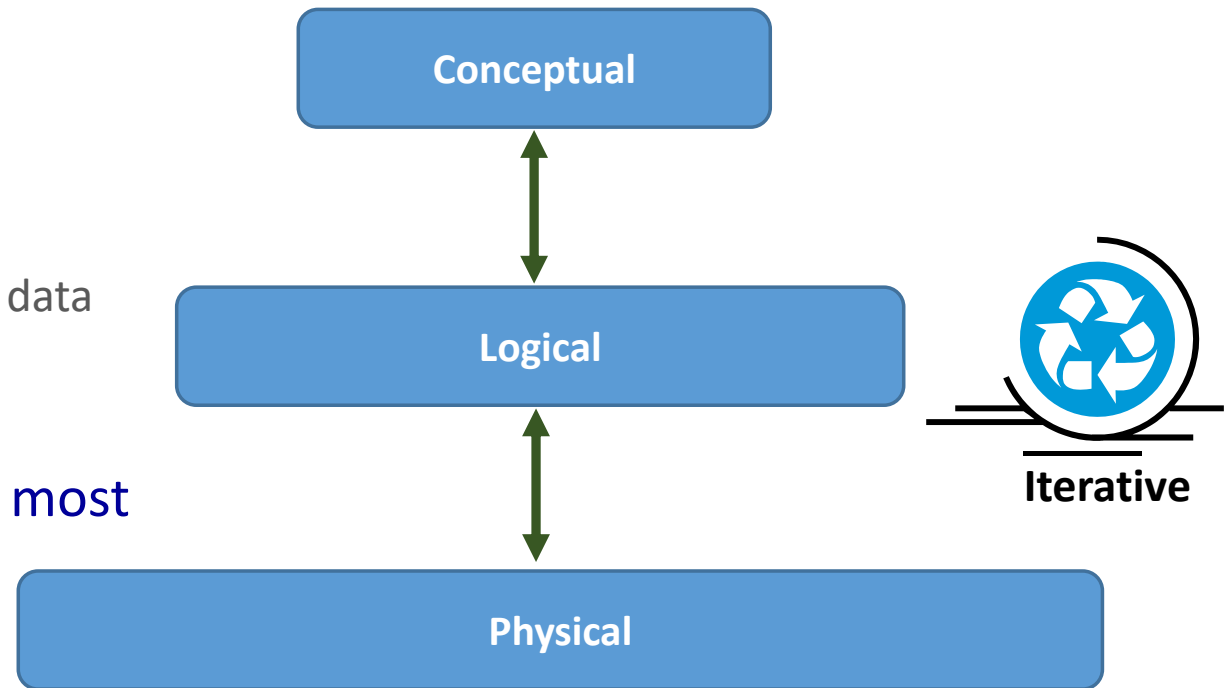
Logical Data Model

- Business-focused, with more detail around data objects & associated business rules



Building Models Top Down vs. Bottom Up vs. “Middle Out”

- Models can be built
 - **Top-Down:** Identifying business concepts, definitions & relationships
 - **Bottom-Up:** Creating an inventory of existing data assets.
 - **Using a Hybrid Approach – Middle Out**
- An Iterative, Hybrid Approach is often the most practical.



Tell a Story

What impact does the data model have on the business?

- Humans have evolved over time as storytellers
 - We can't even sleep without dreaming in stories.
- No one cares about your data model...
 - ... but they do care about the RESULTS of your data model
 - ... **relate the model to a real world impact or scenario..i.e. "story"**

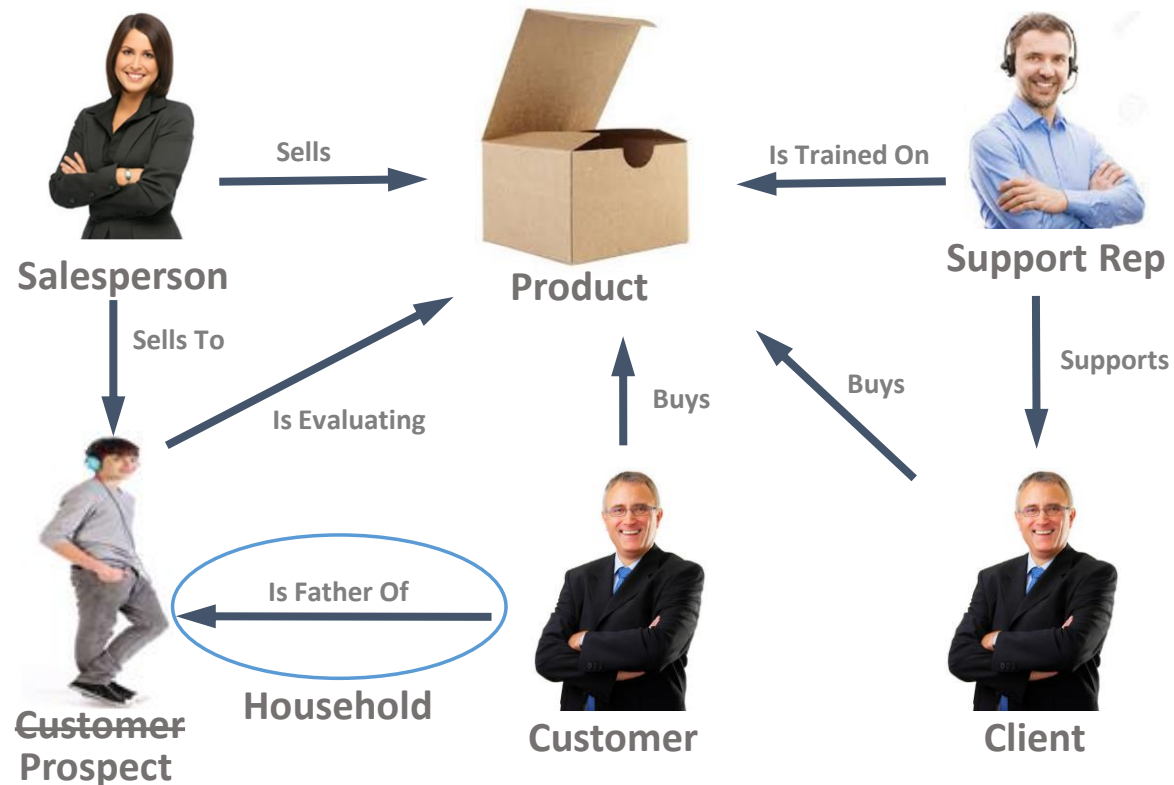
Humans are Storytellers.



A Data Model Describes a Business

Be Creative in your Data Model Presentation

- When working with a business audience, the importance of a data model is in **communication**.
- Use creative ways to show models to a business audience.
- The data model should tell the “story” of the business.



Why Does Conceptual Modeling Matter?

An Example

- You've been tasked to assist in the creation of a Business Intelligence (BI) reporting application for Customers.
- Technical and political challenges exist
 - Numerous systems have been built already—different platforms and databases
 - Parties cannot agree on a single definition of what a 'customer' is
- **Our Proposed Solution:** Start with a Conceptual Data Model

Show me all
customers by region



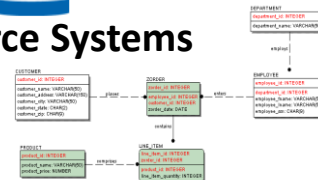
For Data Warehousing

Data Modeling helps answer:

- **What** is the definition of customer?
- **Where** is the data stored?
- **How** is it structured?
- **Who** uses or owns the data?



Source Systems



Relational Model



Data Warehouse



Dimensional Model



BI Report:
Customers by Region



Building a Conceptual Data Model

Starting with the basics

- We start with a very simple data model, with just one object on it, called “Customer”.
- We use an ER Model and show business definitions

Customer

A person or organization that has purchased at least one of our products and has an active account.

Too Simple??



Too Simple?

- Our team thought so, so went ahead and focused on the technical integration, including:
 - Reverse engineering a physical model from each system
 - Creating ETL scripts
 - Migrating the data into a data warehouse
 - Building a reporting system off of the data
- The results?
 - This implementation went “perfectly”, with no errors in the scripts, no data type inconsistencies, no delays in schedule, etc.
 - We built a complex BI reporting system to show our upper management the results.
 - We even sent out a welcome email to all of our customers, giving them a 50% off coupon, and thanking them for their support.



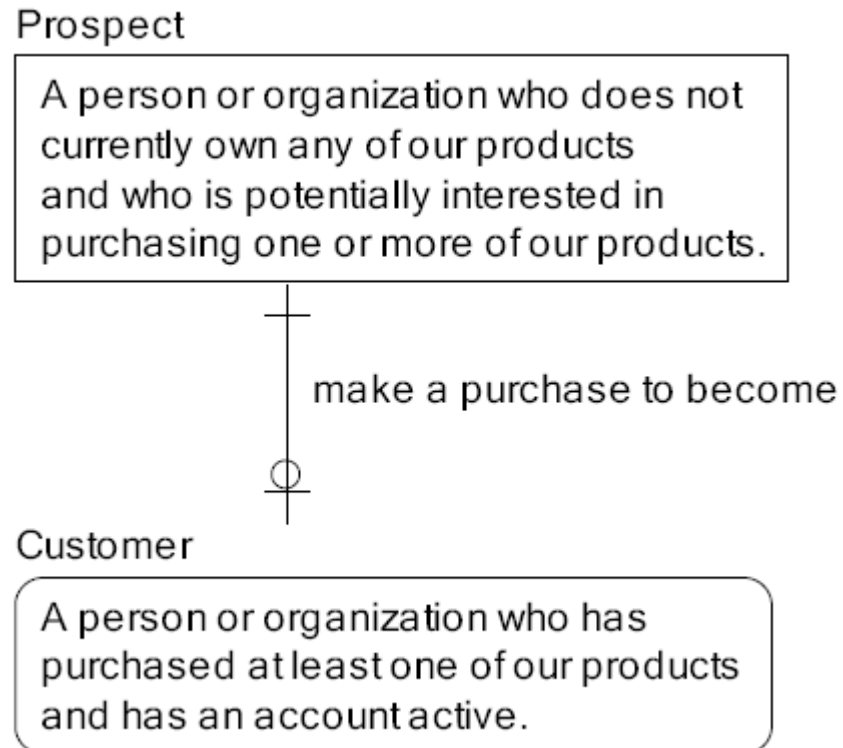
Focusing on the Business

- Until we showed the report to the business sponsor:
 - We can't have 2000 customers in this region! I know we only have around 400!
 - Why is Jones' Tire on this list? They are still evaluating our product! Sales was negotiating a 10% discount with them, and you just sent them a 50% coupon?!?
 - You just spent all of that money in IT to build this report with bad data???



Oops!

- We were mixing current **customers**, with **prospects** (non-customers).
 - We just sent a discount coupon to 1600 of the wrong people!
 - We gave upper management a report showing the wrong figure for our total number of customers!
 - We are now significantly over budget to have to go back and fix this!!
- We started over, this time with a Conceptual Data Model



The Importance of Business Definitions

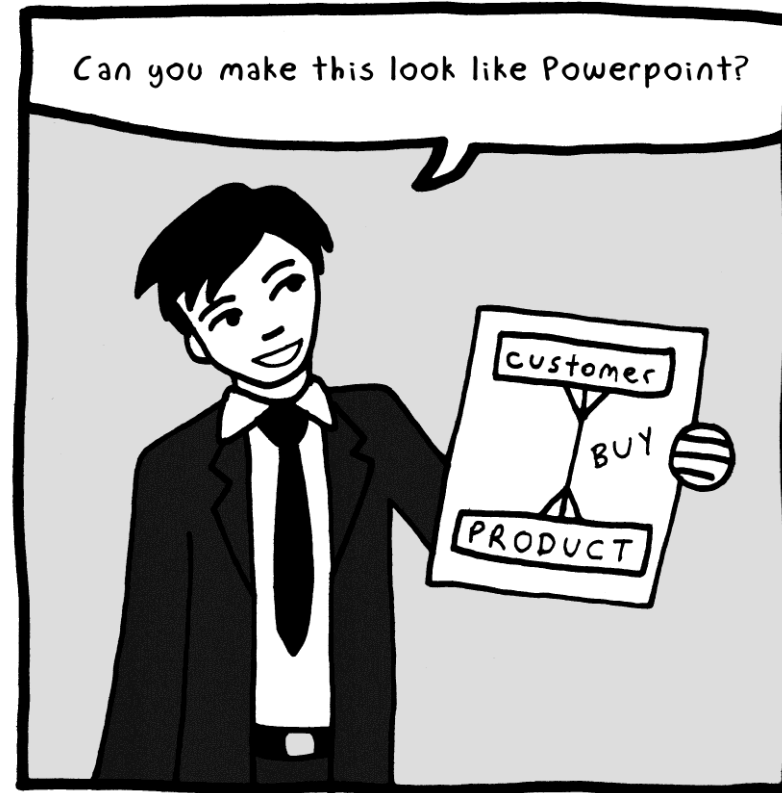


From [Data Modeling for the Business](#) by
Hoberman, Burbank, Bradley, Technics
Publications, 2009

Use the Language of Your Audience

Gaining Buy-In

- When communicating with business stakeholders, it's important to display data models in a way that's intuitive to them
 - PowerPoint-style Conceptual Data Models
 - Use Business Terminology
 - Avoid Excess Detail



Keep It Simple

Eschew
Obfuscation

The Eternal Question...

**Can and Should a Businessperson
learn Data Modeling notation?**



What is an Entity?

The “Who, What, Where, When, Why” of the Organization – the Nouns

Entity: A classification of the types of objects found in the real world --persons, places, things, concepts and events – of interest to the enterprise. ¹

¹ DAMA Dictionary of Data Management

Who?



Salesperson

What?



Product

Where?



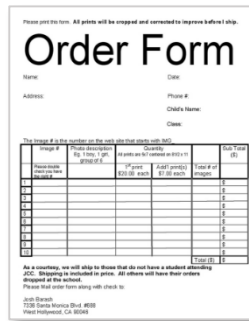
Location

When?



Period

Why?



Item #	Item Description	Quantity	Unit Price	Total Price
1	Item 1	1	\$10.00	\$10.00
2	Item 2	2	\$20.00	\$40.00
3	Item 3	3	\$30.00	\$90.00
4	Item 4	4	\$40.00	\$160.00
5	Item 5	5	\$50.00	\$250.00
6	Item 6	6	\$60.00	\$360.00
7	Item 7	7	\$70.00	\$490.00
8	Item 8	8	\$80.00	\$640.00
9	Item 9	9	\$90.00	\$810.00
10	Item 10	10	\$100.00	\$1,000.00
Total:				\$3,950.00

Order

How?



Invoice

Attributes

Attributes provide more detail about an Entity

- An **Attribute** is a piece of information about or a characteristic of an Entity.

Entity → **Employee**



- Employee Identifier
- Employee Last Name
- Employee First Name
- Employee Hire Date
- Employee Signed Employment Contract
- Employee Drivers License Photo

} **Attributes**

Entity → **Employee**

Employee Identifier
Employee Last Name
Employee First Name
Employee Hire Date
Employee Signed Employment Contract
Employee Drivers License Photo

} **Attributes**



Relationships are the “Verbs” of the Organization

Defining Business Rules

- Relationships define the data-centric Business Rules of an organization
 - An employee can work for more than one department.
 - A customer can have more than one account.
 - Sales are reported monthly.
 - A department can contain more than one employee.

— Relationships are the “lines” on a data model



— Relationships are the “verbs” in a sentence.

—A department can contain more than one employee.



Deciphering Cardinality

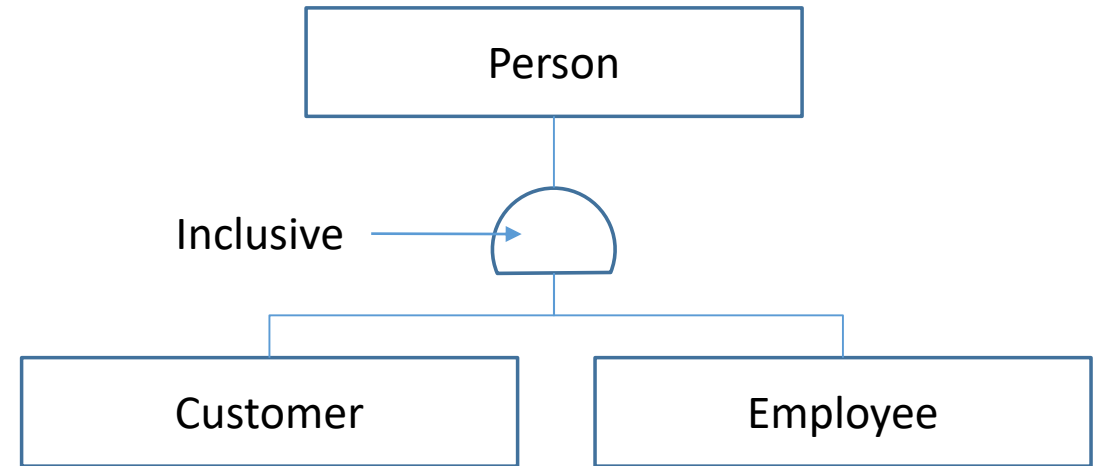
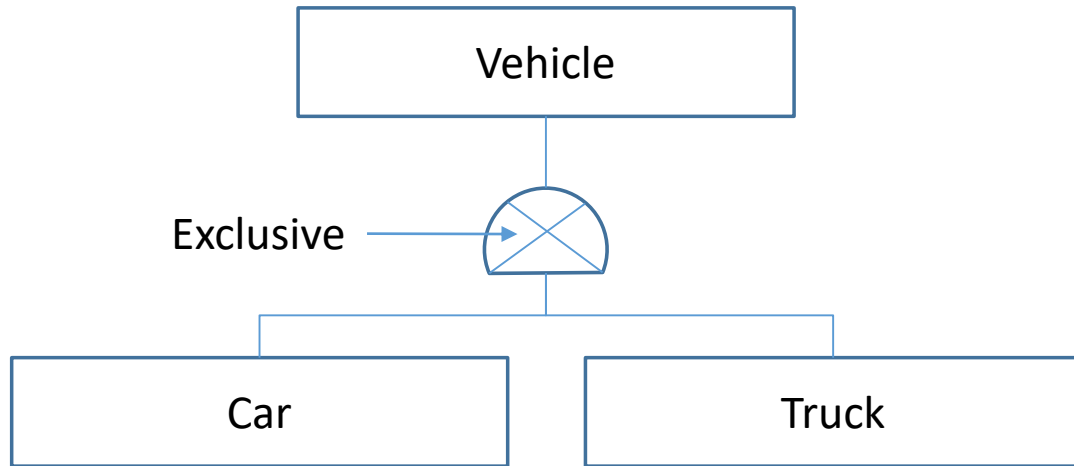
Think of how a child might answer the question “How many?”

- + One = 1 finger
- + More than one = several fingers



Supertypes & Subtypes

- Some Entities naturally split into Sub-Types in a Organization:
 - **Exclusive:** i.e. “**Either/Or**” - a member of the supertype can only one subtype role. For example, a Vehicle can be a Car or a Truck, but not both.
 - **Inclusive:** i.e. “**And**” - a member of the supertype can play more than one subtype role. For example, a Person can be both a Customer and Employee.

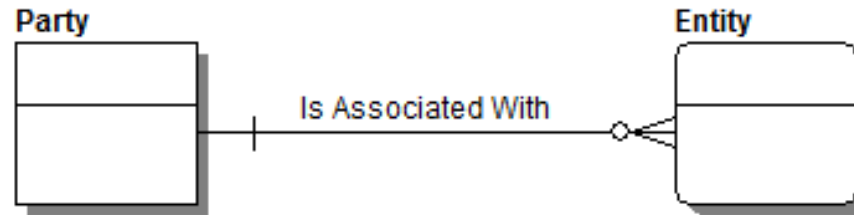


Use the Language of Your Audience

Use Business Terminology

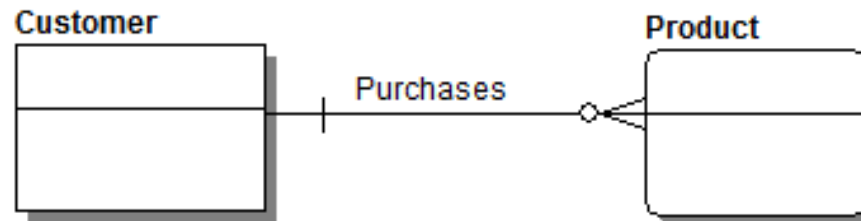
Use Business Terms, not Theoretical Ones

This?

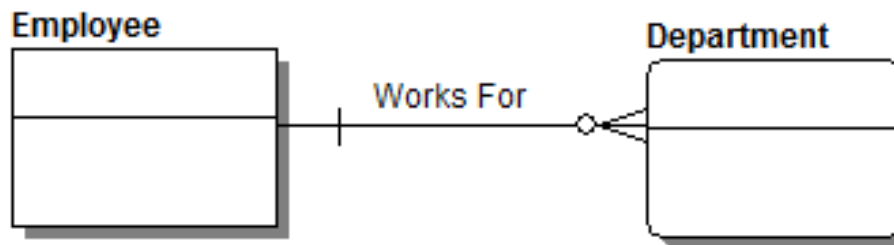


May be academically correct, but too vague to be useful for business users.

Or
This?



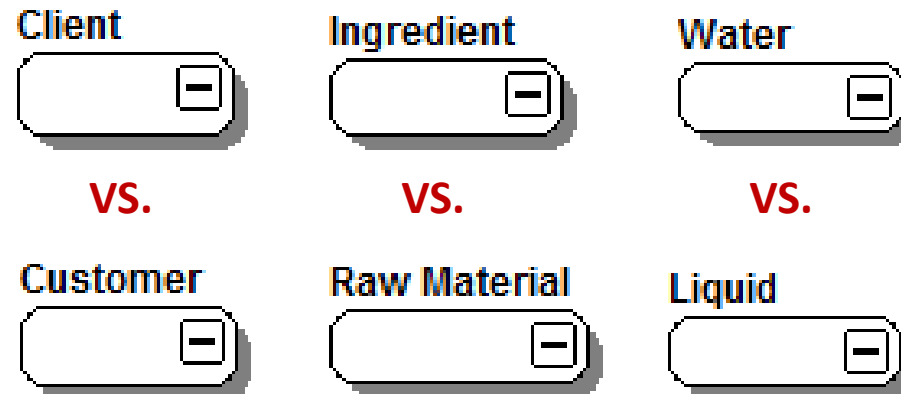
Or
This?



Keep the Focus on the Business

Fight the Right Battles

- Debate actual differences in business meaning, not academic theory
- Determine why differences occur:
 - Is this a different entity?
 - Different names for the same entity?
 - A Supertype / Subtype relationship?
 - Etc.



The Importance of Definitions

- Definitions are as important as the data elements themselves.
- Many data-related business issues are caused by unclear or ill-defined terms

What do you mean by
“**customer**”?

How are we defining a
“**household**”?

We’re calculating “**total sales**”
differently in each region!

What’s the difference between an
“**ingredient**” and a “**raw material**”?

Sales is using a different
“**monthly calendar**” than
Finance.

“**API**” as in “Application Programming Interface?”
or “American Petroleum Institute”? Or a bee?

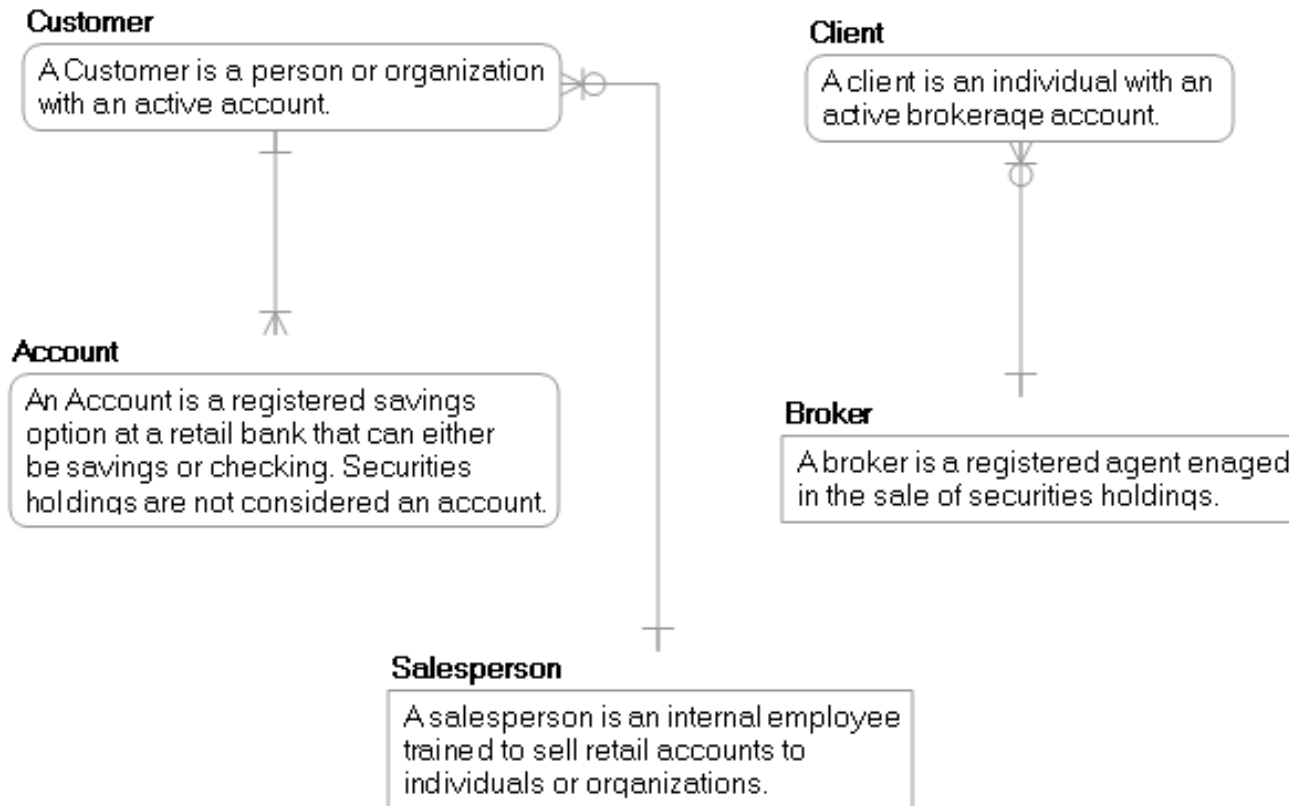
What’s an “**equity
derivative**”?

What’s a “**PEG ratio**”?



Store & Display Definitions in a Data Model

- Data Models are a great place to store business definitions
 - Display them on the model for a business audience
 - Store them in the model repository for reuse across the organization (various users, tools, etc.)

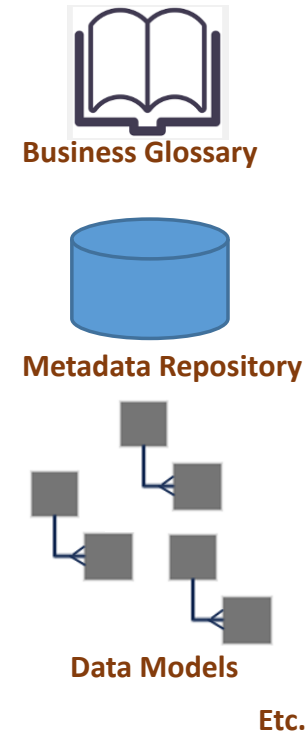


Human Metadata

Avoid the dreaded “I just know”

- Much business metadata and the history of the business exists in employee’s heads.
- It is important to capture this metadata in an electronic format for sharing with others.
- Avoid the dreaded “I just know”

Part Number is what used to
be called Component
Number before the
acquisition.



Better Definitions Drive Better Communication

- Wouldn't it be helpful if we did this in daily life, too?
- i.e. "Let's go on a family vacation!"

Person	Concept	Definition
Father	Vacation	An opportunity to take the time to achieve new goals
Mother	Vacation	Time to relax and read a book
Jane	Vacation	A chance to get outside and exercise
Bobby	Vacation	Time to be with friends
Donna	Vacation	More time to build data models
Ian	Holiday	You Americans use crazy words for things



Workshop: What is in a Name?

The importance of good definitions

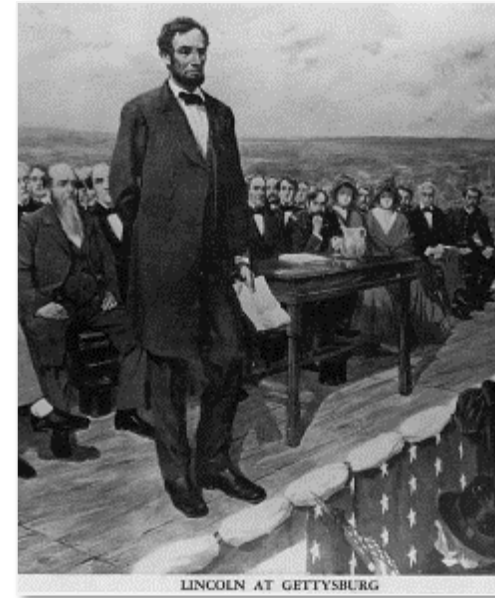
- How many different terms & definitions can we come up with for the general term “address”?
- For example, here are some obvious ones:



Residential Address



Mailing Address



Presidential Address



Key Architectural Tools & Components

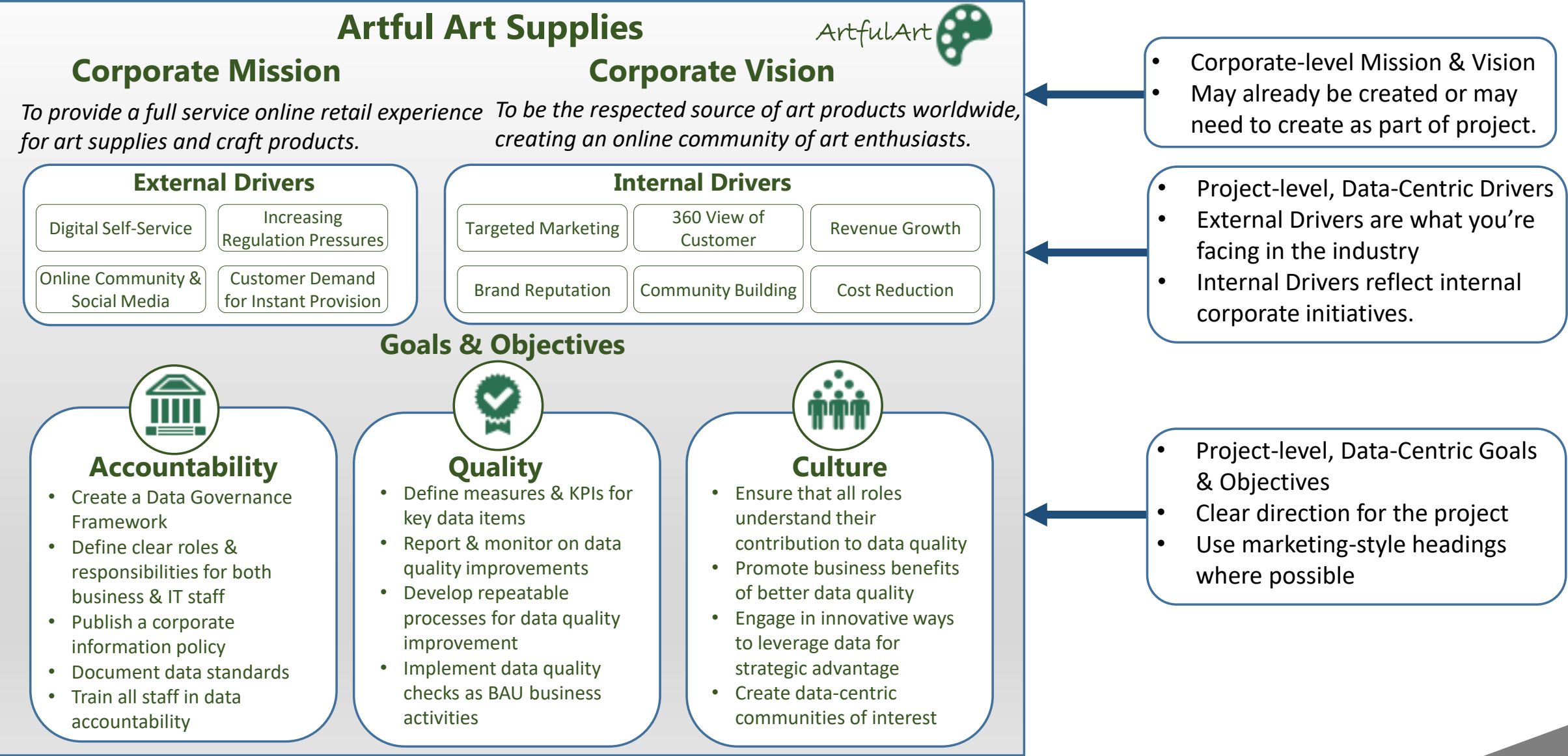
The Motivation Model

Common Set of Goals & Guidelines

- There is benefit in formally documenting the motivations for the project.
 - Commonly-agreed upon guidelines for project tasks & deliverables
 - Reminder of “why we’re doing this” - Neutral arbitrator for disagreements
- Components of the Motivation Model include:
 - **Corporate Mission:** describes the aims, values and overall plan of an organization.
 - e.g. To be provide the most comprehensive, customer-driven online shopping experience in the market
 - **Corporate Vision:** describes the desired future state
 - e.g. To transform the way consumers purchase goods through social-media-driven connections.
 - **External Drivers:** What market forces are driving this initiative?
 - e.g. Cultural shift to online retail
 - **Internal Drivers:** What internal pressures or initiatives are key for this project?
 - e.g. Disparate systems require need for an integrated view of customer
 - **Project Goals:** high level statement of what the plan will achieve.
 - e.g. To improve customer satisfaction with over 90% satisfaction rating in 2 years.
 - **Project Objectives:** outcome of projects improving capabilities, process, assets, etc.
 - e.g. To link consumer purchase history with social media activity.



Sample Business Motivation Model



Global Telco Company

Business Transformation to “Becoming a Data Company”



- An international telco company was looking to leverage data as a corporate asset.
 - Data is seen as their most strategic asset and corporate focus
 - Telecommunications is a secondary goal – becoming a commodity
- Opportunities in Leveraging Big Data – Motivation Model was Key
 - New Product & Service Development
 - Data is Anonymized & sent to digital arm for new product and development
 - Data-driven prototyping – using analytics to see what products are working best and used most
 - Customer Value Management
 - Marketing with Opt-in, e.g. ads for bolt-on roaming when enter a new country—before they use a competitor platform
 - Sentiment Analysis (via call logs & social media)
 - Operational Performance & Maintenance
 - Network Optimization
 - Integrating call failure information and location information with survey data
 - Monetization
 - Resell anonymized data to Retail, City Planners, etc.
 - Footfall with integrated geospatial location data



The Motivation Model

BIG DATA STRATEGY VISION

Pro-active & innovative Big Data infrastructure solutions, supporting identification & delivery of organisational value, whilst driving efficiency & reducing solution cost

BIG DATA STRATEGY PRINCIPLES

- Define a minimum number of consumption patterns covering common business use cases
- Differentiate Big Data opportunities in the context of conventional Information Management and BI
- Create a small number of Big Data service catalogue definitions supporting each pattern

BUSINESS DRIVERS

- Add Value to Local Markets**
 - Offer guidance and education around Big Data
 - Establish evaluation criteria
 - Standardise service offerings
- Optimise Commercial & Operational Value from Data**
 - Identify opportunities
 - Enable agility & faster time-to-value
 - Achieve economies of scale
- Leverage Rapid Growth of Data Assets**
 - From 2TB per OpCo per day
 - 10-20 fold increase in coming years
 - Internal & external sources

IT DRIVERS

- Develop a Core Competency in Big Data Technologies**
 - Define new opportunities
 - Identify robust, fit-for-purpose Hadoop platforms
 - Leverage data as an asset for competitive advantage
- Leverage Re-useable Solutions**
 - Share core information assets
 - Avoid fragmentation
 - Improve infrastructure, operational, & procurement efficiencies
- Align with Enterprise Architecture**
 - Integrate Big Data Analytics with Core BI
 - Provide standardised Application Frameworks
 - Leverage common Infrastructure Patterns

BIG DATA GOALS & OBJECTIVES

Provide a Clear Definition of Big Data

- Create an overview of Hadoop stack solution components
- Provide sample use cases and data patterns
- Establish an evaluation criteria for both business and technology solutions

Create Common Use Case Patterns

- Review use cases & identify high-value commercial & operational themes/patterns
- Compare use cases from other telcom or related enterprises to identify new or high-value samples
- Identify a small number of core, reusable use case patterns to be stored in catalogue

Create a Common Service Catalogue

- Publish a small number of standard use case patterns, data set specifications, & guidance for additional "sand box" exploration
- Map common, core use cases against potential technology architectures
- Identify non-functional requirements such as security, privacy, network, persistence, volumetrics, etc.

Define Common, Reusable Technology Architectures

- Evaluate existing platforms and POC environments for pros/cons
- Review Big Data technology stacks against requirements
- Provide education/guidance re: technology stack components, guidelines for use, and skill sets needed
- Identify core data sets and data flow patterns for population/maintenance

- Motivations from both Business & IT
 - Business focused on gaining value from data
 - IT focused on cost-savings & reuse
- Common Goals & Objectives
 - Use Case Patterns
 - Clear definition of Big Data (& what it's not)
 - Common Service Catalog
 - Reusable Technology & Architecture

Exercise: 15 mins

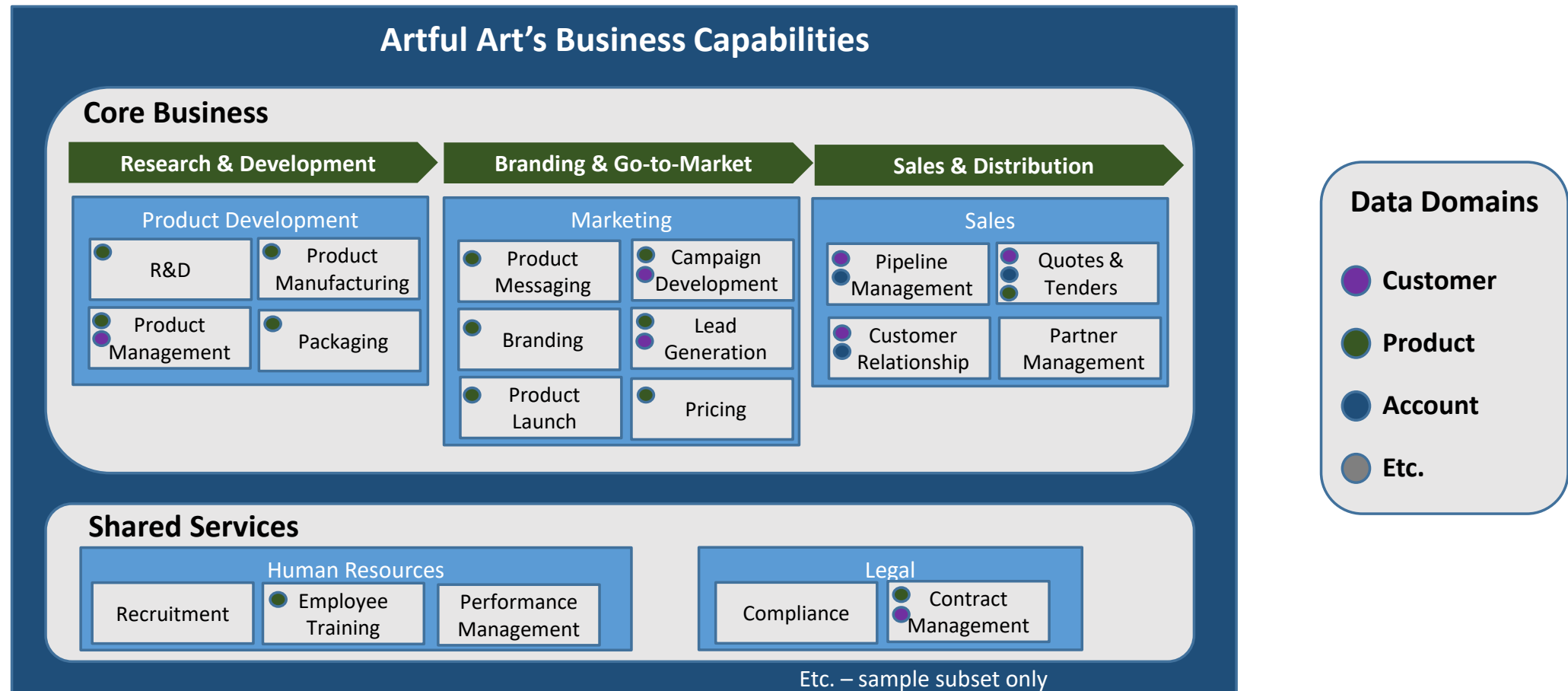
Now You Try It!

- Draft a brief Motivation Model for your organization
 - What is your Corporate Mission & Vision? And/or your Project Mission & Vision?
 - Key internal business drivers
 - Key external business drivers
 - Goals & Objectives for your data project
- Rethink your 2 minute “elevator pitch” for your current project.
 - Did this change your “pitch” in any way?



Business Capability Models

- A business capability model outlines the core functional areas of the organization.
 - Note: this is not the same as an organizational chart
 - Capabilities can be overlaid with key data domains to create a “heat map” of cross-functional data usage.

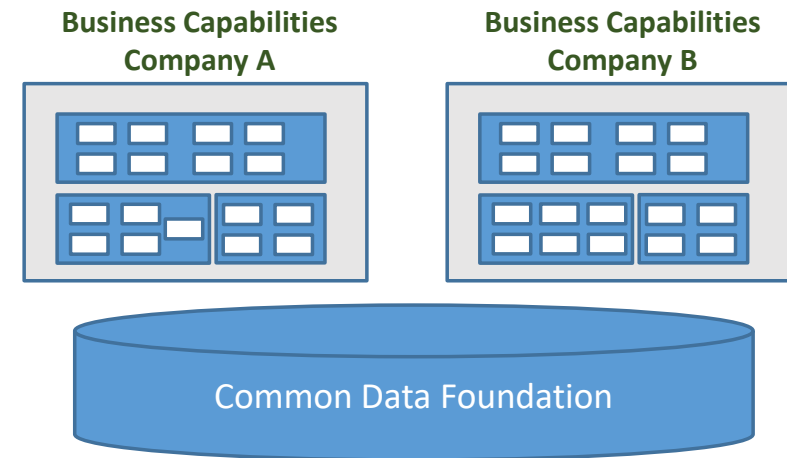


Data-Driven Merger for Financial Services

The combined information assets of both companies is one of our biggest strategic advantages.

- CEO

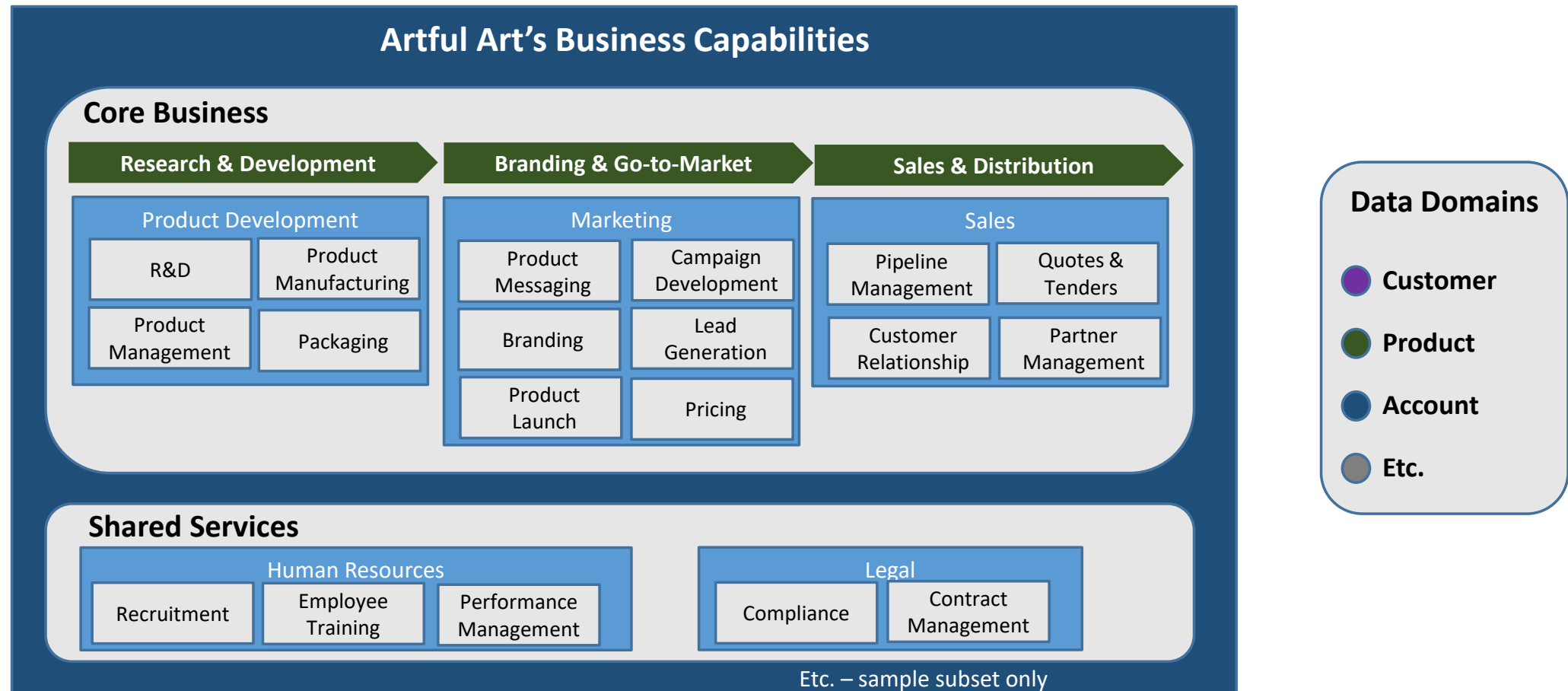
- A key driver for a recent merger of two large financial institutions was the integration of data assets
 - Streamlining the merger of the two organizations by *integrating the data assets*
 - Identify ways in which *data can be used to strategic advantage*
- Organizational Structure & Business Capability Alignment were critical
 - Understanding how data was used across the organization
 - Identifying efficiencies & opportunities for collaboration



Discussion

What do you think?

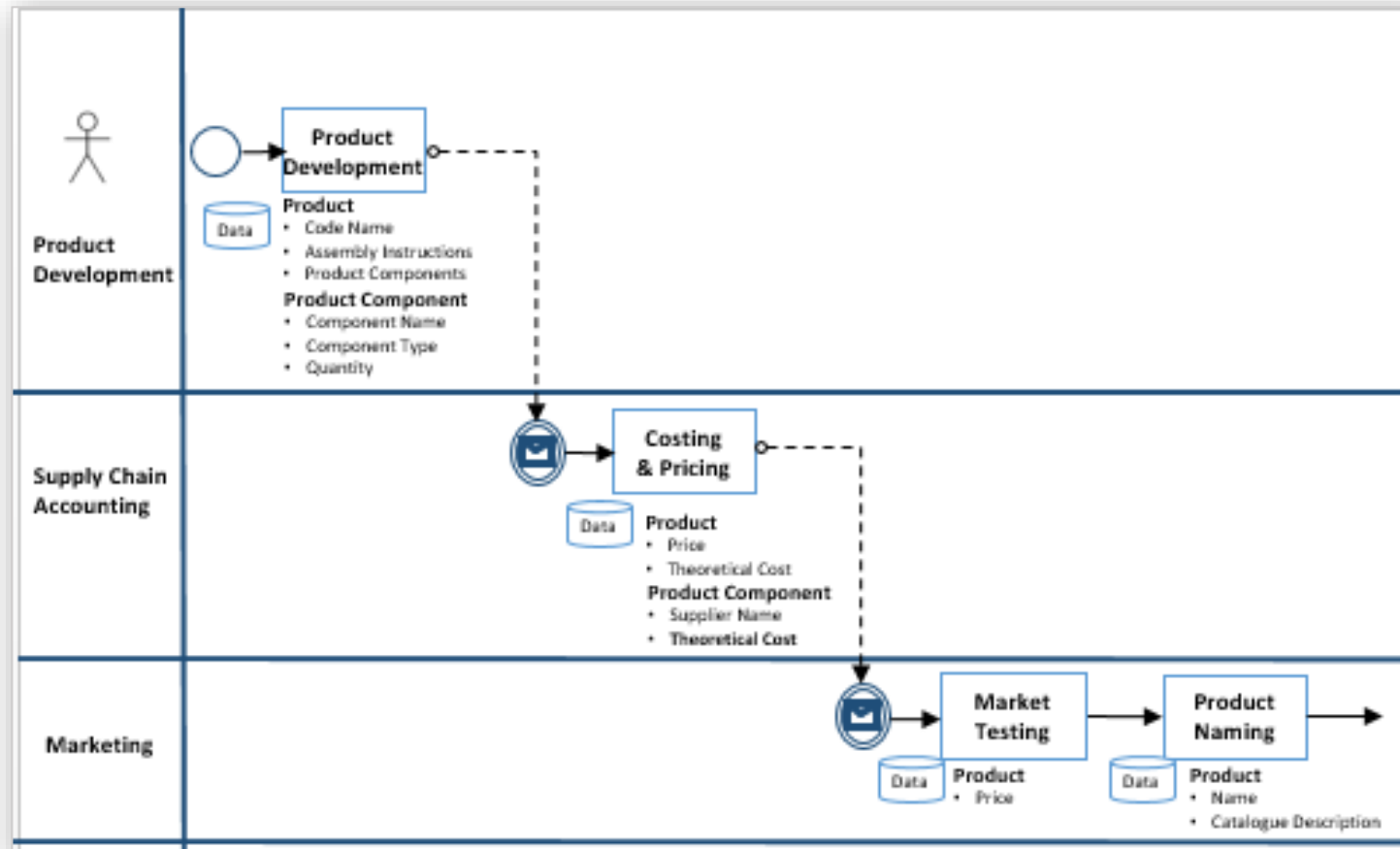
- What are some of the key business capabilities that leverage data in *your organization*?



Process Models

Identifying key data dependencies in core business processes

- Process models are a helpful tool for describing core business processes.
 - “Swimlanes” outline organizational considerations
 - Data can be mapped to key business processes to understand creation & usage of information.



Survey

DAMA Phoenix

Who is currently using a business process model in their organization?



Industry Survey Results*

64% of DATAVERSITY respondents are using a business process model*.



Linking Data with Process for Master Data Management (MDM)

Managing the Data that Runs the Business

- An international restaurant chain realized through its digital strategy that:
 - While menus are the core product that drives their business...
 - They had little control or visibility over their menu data
 - Menu data was scattered across multiple systems in the organization from supply chain to kitchen prep to marketing, restaurant operations, etc.
- Menu data was consolidated & managed in a central hub:
 - **Master Data Management** created a “single view of menu” for business efficiency & quality control
 - **Data Governance** created the workflow & policies around managing menu data
- Process Models & Data Mappings were critical
 - **Business Process Models** to identify the flow of information
 - **CRUD Matrixes** to understand usage, stewardship & ownership

Product Creation & Testing



Menu Display & Marketing



Supply Chain



Point of Sale & Restaurant Operations



CRUD Matrix

Create, Read, Update, Delete

- CRUD Matrices shows where data is Created, Read, Updated or Deleted across the various areas of the organization
- This can be a helpful tool in data governance & data quality.

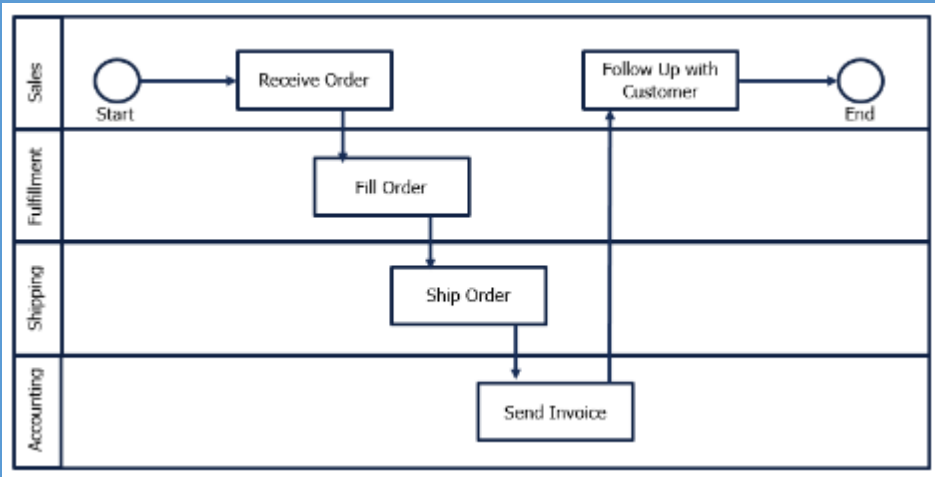


	Product Development	Supply Chain Accounting	Marketing	Finance
Product Assembly Instructions	C	R		
Product Components	C	R		
Product Price		C	U	R
Product Name	C		U,D	
Etc.				

Process Models & CRUD Fit Well Together

- Business Process Models describe key activities within the organization.
- Linking these processes to the data that is Created, Updated, or Deleted (CRUD) is important to understanding data usage.

Business Process Model



CRUD Matrix

	Customer	Order	Account	Invoice	Product
Receive Customer Order	R	C	C, R		
Process Customer Order	C,R,U		R,U		R
Fill Order	R,U		R,U		R,U
Send Invoice	R,U		R,U	C	

EA Provides a Holistic View to Support Business Transformation



Summary

- Today's Digital Transformation is largely driven by data.
- Enterprise Architecture helps put data in the context of the larger organization
 - People
 - Process
 - Capability
 - Etc.
- There are a number of tools and artifacts to support enterprise architecture
- Just as you model data, you need to model the organization itself
- Focusing on the areas with the highest business value help generate “quick wins”
- Aligning with business motivation & drivers is key to success – remember to continually “market” your data initiative



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White Paper: Emerging Trends in Metadata Management

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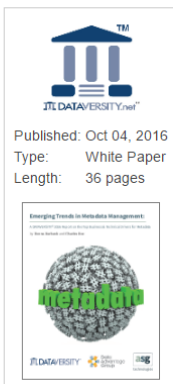
Emerging Trends in Metadata Management

White Paper Published By: **DATAVERSITY**

Metadata Management is more important than ever. More than 80% of the survey respondents upon which this report is based agreed that its value to the contemporary, data-driven enterprise is greater than at any time in the past. Two of the primary key trends driving such an impact are the growing technical complexities of the entire Data Management industry due to a range of new developments such as non-relational databases, Big Data processing, Semantic technologies, the Internet of Things, and an ever greater need to combine legacy data with new data types. Along with such developments, there is also a greater push by business users to work directly with data due to regulation and compliance issues, Self-Service BI, and an assortment of different Data Governance, Data Quality, and other initiatives within enterprises today. Such trends have created an ever-increasing imperative to manage Metadata with more accuracy, clarity, and reliability.

The research report analyzes a 2016 DATAVERSITY® survey on Metadata Management. The survey asked many different questions concerning the state of Metadata Management within the enterprise, some of those included:

- Why is Metadata important to your organization?
- How do you receive training in Metadata Management?
- For what types of information do you currently manage Metadata?



Search Library

START HERE

Please complete the form below.

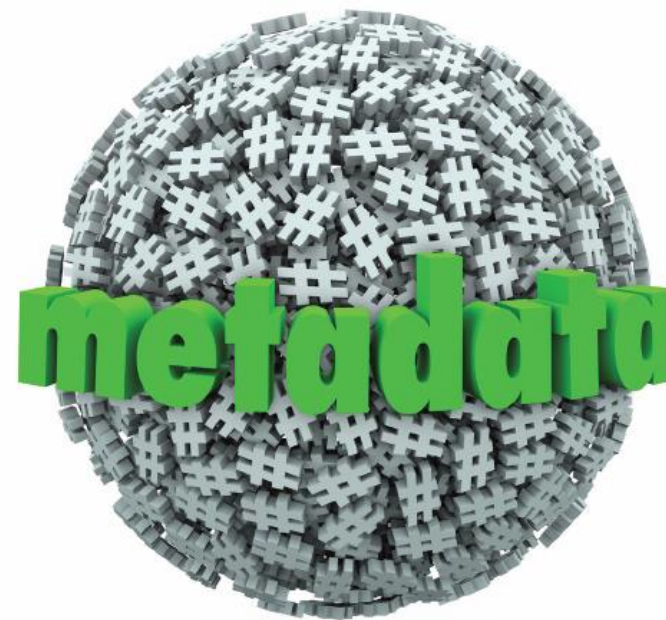
* denotes required information.

* First Name	<input type="text"/>
* Last Name	<input type="text"/>
* Company Name	<input type="text"/>
* City	<input type="text"/>
* State/Region	<input type="text"/>
* Country	<input type="text" value="United States"/>
* Zip/Postal Code	<input type="text"/>
* Phone	<input type="text"/>
Address Line 1	<input type="text"/>
Address Line 2	<input type="text"/>
* Company Size	<input type="text"/>
* Industry	<input type="text"/>

Emerging Trends in Metadata Management:

A DATAVERSITY® 2016 Report on the Top Business & Technical Drivers for Metadata

by Donna Burbank and Charles Roe



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- Learn the basics of Metadata Management and practical tips on how to apply metadata management in the real world. This online course hosted by DATAVERSITY provides a series of six courses including:
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 - The Business Value of Metadata
 - Sources of Metadata
 - Metamodels and Metadata Standards
 - Metadata Architecture, Integration, and Storage
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Register [here](#)
- Use code **“GDS”** for **20% discount**
- Other courses available on Data Governance & Data Quality

Visit: <http://training.dataversity.net/lms/>



Questions?

Thoughts? Ideas?

